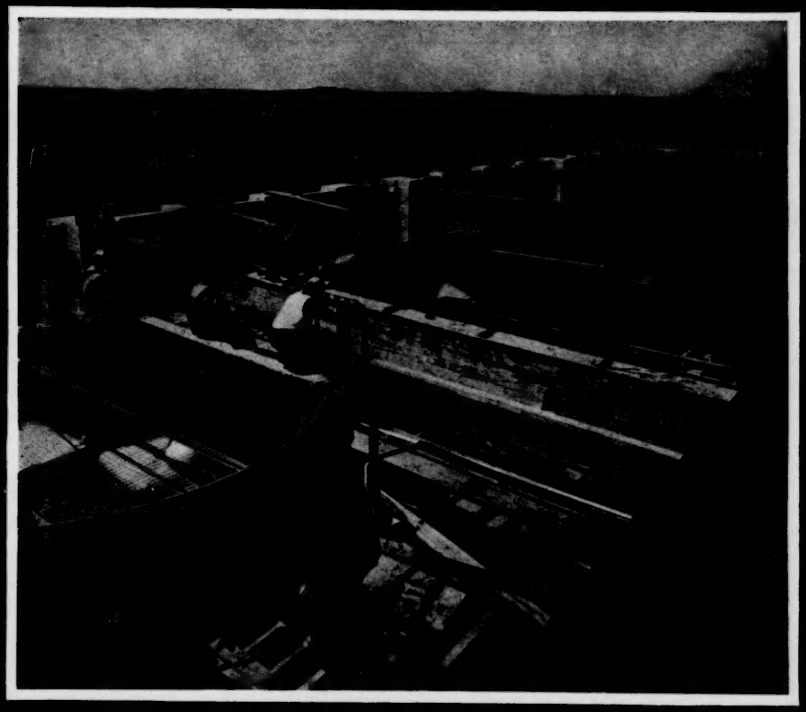
ICE and REFRIGERATION



Diesel Mechanical Cooling for Refrigerator Car ..... Page 13

SEPTEMBER • 1951

Air Conditioning ... Problem Solv... ...

NOW! LOWER COSTS FOR LOWER TEMPERATURES

when you use the new and improved

TEXACO CAPELLA OIL (WAXFREE)

Texaco Capella Oil (Waxfree) assures higher refrigerating compressor efficiency, lower maintenance costs and clean operation even at temperatures of −100° F!

Designed especially to meet today's deep-temperature demands, *Texaco Capella Oil (Waxfree)* has been proved by test to have lower haze and floc temperatures than any other oil. You can be sure of freedom from wax precipitation . . . can count on *Texaco Capella Oil (Waxfree)* for the extreme purity, low pour test, oxidation resistance and freedom from moisture that assure efficient, low-cost operation.

There is a complete line of *Texaco Capella Oils (Waxfree)* to meet the requirements of every type and size of compressor . . of every temperature and operating condition. Available in specially sealed 55-gallon drums, 5-gallon, 1-gallon and 1-quart cans.

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TEXACO

TEXACO Capella Oils (Waxfree)

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

the *Trend* is to SIZED ICE.. Tube-Ice

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1 Only 3.6 KWH is required to make 100 pounds of Tube-Ice with the Vogt 2,000 Pound Package Unit . . . a figure unmatched by any other sized ice machine in the market.

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3 Tube-Ice conforms to State laws and local ordinances covering the sanitary production and sizing of ice used for food refrigeration and beverage cooling.

4 The 2,000 Pound Tube-Ice Unit provides that needed ***extra capacity*** to meet peak loads in hotels, restaurants and institutions which use up to 1,000 pounds of sized ice daily.

Descriptive literature and full information sent upon request.

HENRY VOGT MACHINE CO., Louisville 10, Ky.

Branch Offices: NEW YORK, CHICAGO, CLEVELAND, DALLAS, PHILADELPHIA, ST. LOUIS, CHARLESTON, W. VA.

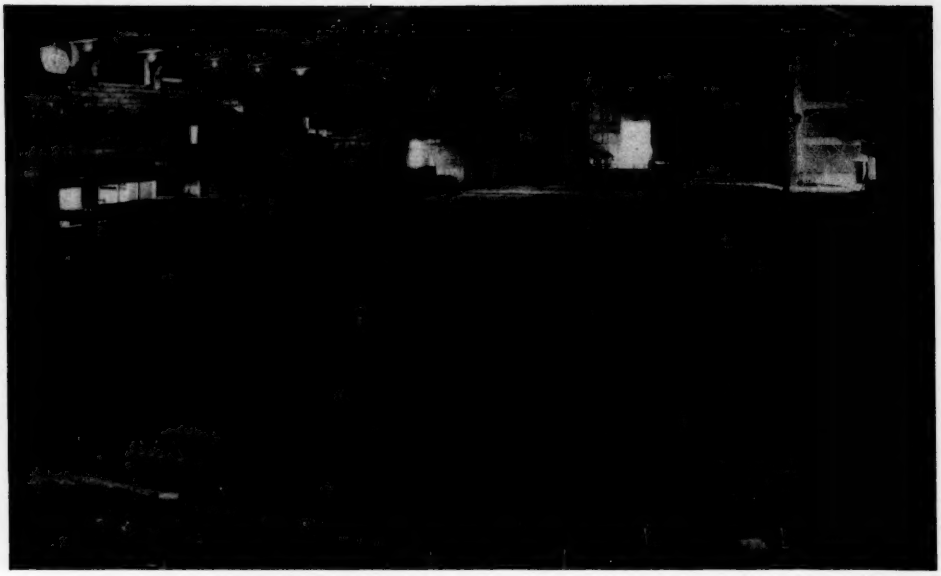
Vogt Automatic TUBE-ICE MACHINE

2,000 Pound Package Unit

At the flick of a switch

CRUSHED ICE or CYLINDER ICE

The Finest ICE MAKING UNIT EVER MADE



IN THIS NEW SKATING RINK . . .

Byers Wrought Iron Pipe helps keep maintenance costs

from cutting a fancy figure

Recognizing that pipe failure in the skating rink of the new Onondaga County Memorial Auditorium, Syracuse, N.Y., would result in costly "down-time" plus possible replacements or excessive repairs, the designers took decisive steps to assure permanence by specifying genuine wrought iron pipe. Byers 1" Wrought Iron pipe on 4" centers was installed. This corrosive resistant material was also used to safeguard the pipe coils in the ice dumps, waste pipe vent stacks, and roof drainage and fire stand piping. Edgarton and Edgarton, Architect—Engineer Associates were the architect; Robson and Woese, the mechanical engineers.

Because of the severe conditions in skating rink installations, any pipe that is not inherently corrosion-resistant is doomed to early failure. And since corrosion is a factor which cannot be eliminated, the only practical solution is in the use of a durable pipe material. The superior service qualities of genuine wrought iron for this service have been decisively confirmed in dozens of installations. Its widespread and continued use is the best possible index of its ability to stay on the job longer, at low cost per year.

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This notch-fracture test specimen illustrates the unique fibrous structure of genuine wrought iron—which is responsible for the high corrosion resistance of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

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WROUGHT IRON

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Ice and Refrigeration

VOLUME 121 NUMBER 3

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September 1951

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pre-publication announcement of a new book on refrigeration

BASIC REFRIGERATION

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by **GUY R. KING, Refrigeration Instructor**
Santa Monica Vocational School

WITHIN the 29 chapters of this 500-page book is contained a complete and simplified presentation of the fundamentals of refrigeration, giving equal treatment to all common refrigerants, design, operation and servicing of the apparatus and systems.

The author has drawn on a wide and varied experience in the practical aspects of refrigeration, coupled with many years of teaching the subject. BASIC REFRIGERATION is written in non-technical language and the author has recognized the requirements of the refrigeration engineer, installer, salesman, student and instructor, compiling the text in a manner which progressively treats the subject from fundamentals to complete systems.

The text is supplemented by an unusually large number of excellent illustrations, (348). All basic points are graphically illustrated in a way that creates additional interest for the reader and assists him to gain a full understanding.

Numerous example problems are given along with a step by step solution. Each chapter is followed by a good group of questions.

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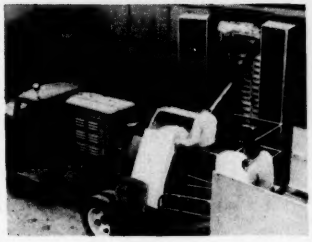

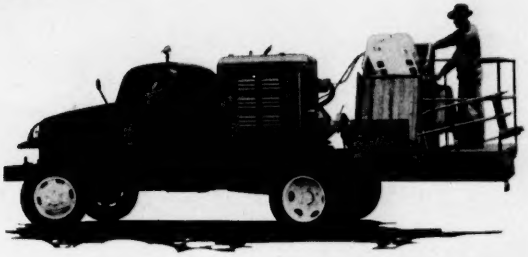

Are you losing out on profitable crushed ice business because you're not located on a railroad siding or truck terminal? Then get a Conveyco truck-mounted ice crusher-blower and take crushed ice service to your customers.

No matter what the conditions are, Conveyco has ice crushing, blowing and conveying equipment to meet your need. A glance at the equipment illustrated here gives you an idea of the variety of ice crushers and blowers available through Conveyco.

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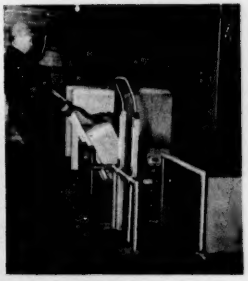

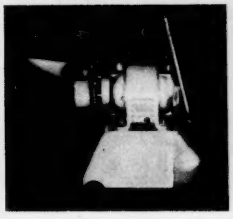

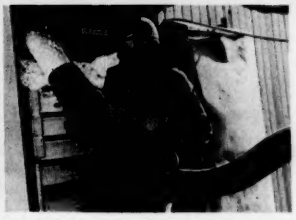

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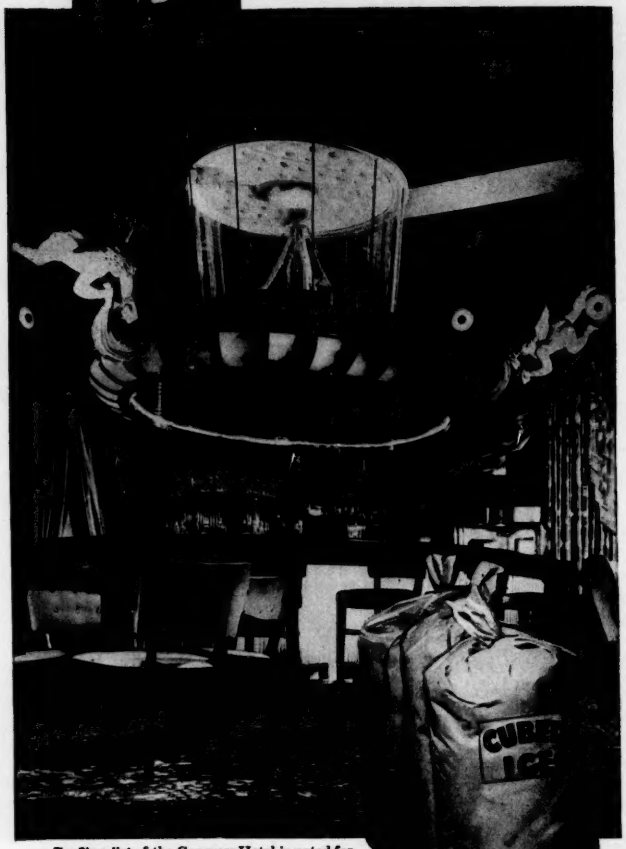
"For a fine hotel, Packaged Processed Ice is a sanitary necessity"

says Nino Bignami, Director Food & Beverage, Congress Hotel, Chicago Illinois



The Glass Hat of the Congress Hotel is noted for its glamour and gaiety on Chicago's famous Michigan Boulevard.

Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet...thanks to a water repellent resin that binds the fibres of the paper firmly together.

The Extra Service That Makes the Sale

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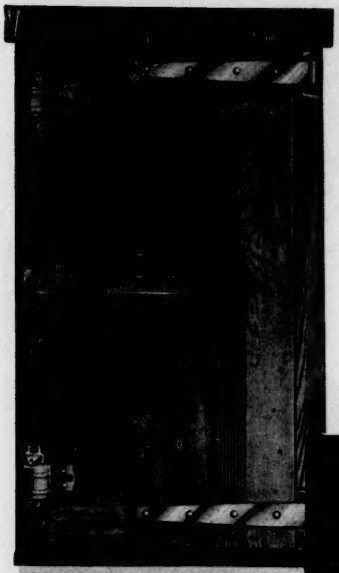
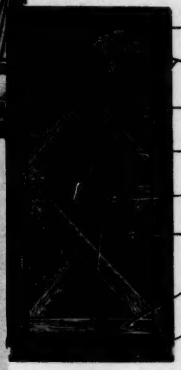
Bags of Kraft, Transparent Films, Waxed Paper, Classine, Laminates

THIS IS A Butcher Boy COLD STORAGE DOOR



LEADER IN APPEARANCE AND CONSTRUCTION

Butcher Boy offers the ONLY cold storage door which will maintain a 100% tight seal and insure ease of opening and closing at all times. Butcher Boy equipment is built of the highest quality materials obtainable and constructed for greatest rigidity. Besides the doors and special features shown, Butcher Boy offers a complete service on special refrigerator windows and fronts. We will be pleased to give estimates on any cold storage problems. Send us your specifications. There is no obligation.



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INSIDE UPRIGHTS
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SECONDARY INSULATION
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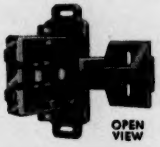
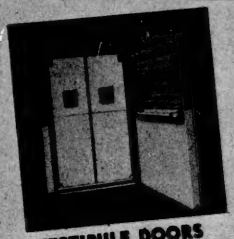
Adjustable Tension • Bronze Bearing • Steel Rollers • Extra Heavy Casting • Heavy Galvanized • Adjustment Feature • 2 Steel Springs.



OPEN VIEW



VESTIBULE DOORS

Butcher Boy Vestibule doors are used where long periods of opening prevail. Doors are kept in closed position by an automatic self-closing device which prevents refrigeration losses.

A BUTCHER BOY Exclusive FEATURE

LONG LIFE due to vertical bevels.

STRENGTH because of cross-grain construction.
APPEARANCE due to the streamlined nature of the "Floating Joint."

"FINGER TIP" DOOR OPENERS

Minimize the effort of opening heavy cold storage doors by application of the laws of leverage Extra heavy, long, modernistic handles. Easily installed on any door.

TRACK DOOR OPERATOR

The Butcher Boy Track Door operator is simple and practical. Its operation is SMOOTH—POSITIVE—AUTOMATIC. Made of SOLID BRONZE. Completely gasketed to prevent leaks in "closed" position.

METAL-CLAD DOORS

Butcher Boy offers this type of door for fire protection purposes. Joints and seams are tabled and locked, no solder and no nail heads exposed.

SUPER-FREEZER (OVERLAP) DOORS

A special type of cold storage door designed primarily for near-zero or sub-zero temperatures. It prevents doors from becoming icy and therefore hard to open.

Since 1905 Butcher Boy PRODUCTS

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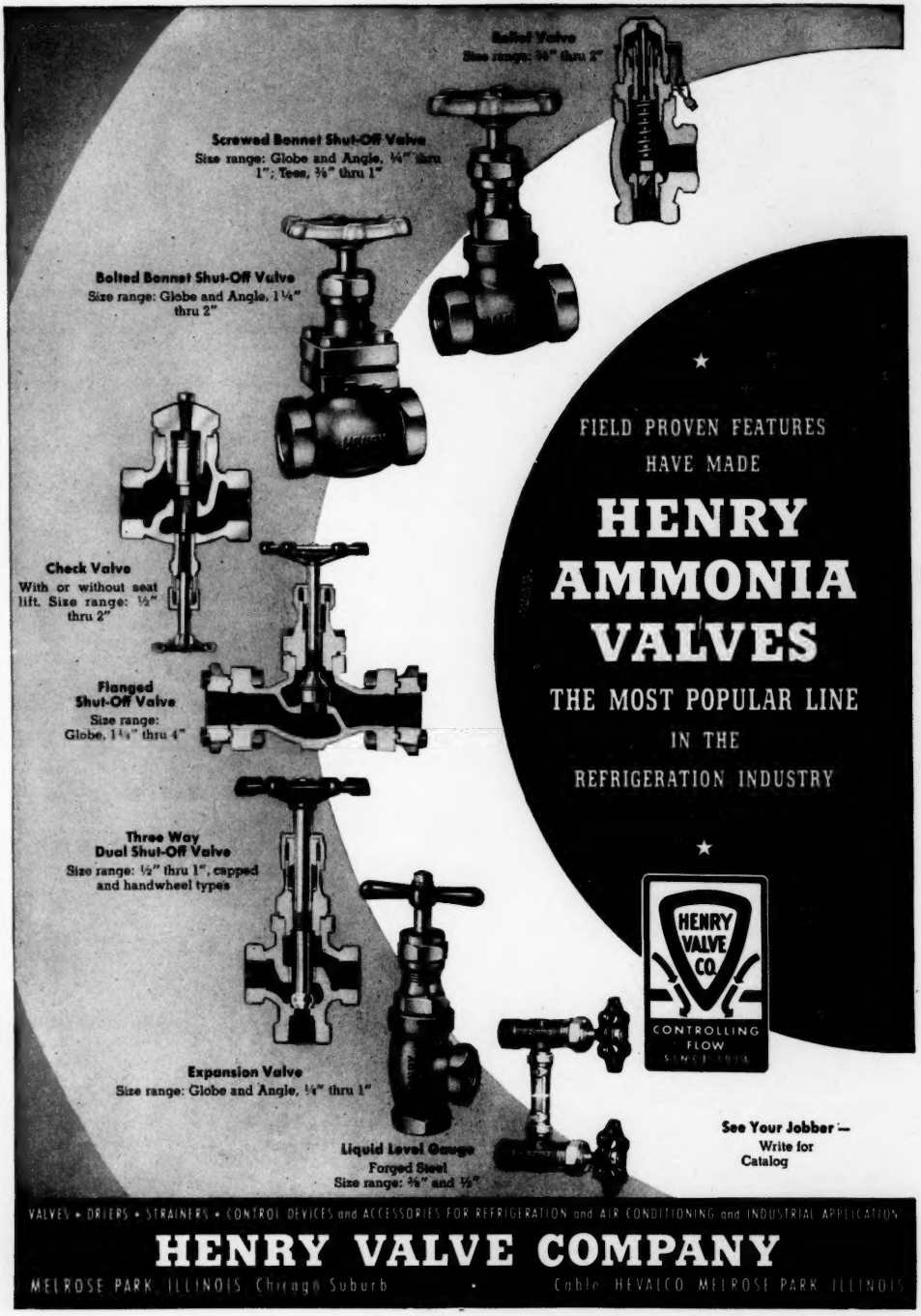
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Size range: ¾" thru 2"
Screwed Bonnet Shut-Off Valve
Size range: Globe and Angle, ¼" thru 1"; Tees, ⅜" thru 1"
Bolted Bonnet Shut-Off Valve
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With or without seat lift. Size range: ½" thru 2"
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Size range: Globe, 1¼" thru 4"
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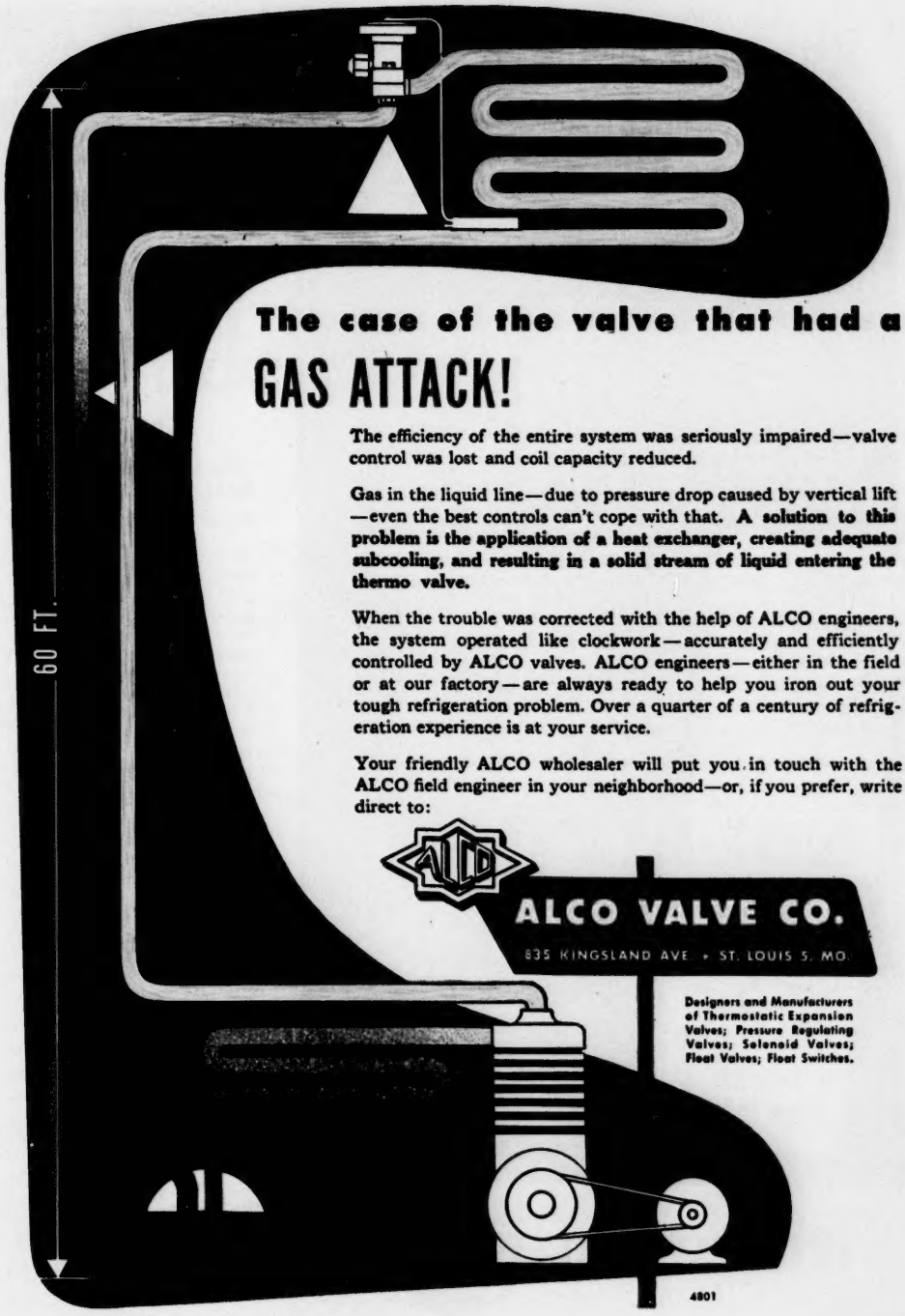

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GAS ATTACK!

The efficiency of the entire system was seriously impaired—valve control was lost and coil capacity reduced.

Gas in the liquid line—due to pressure drop caused by vertical lift—even the best controls can't cope with that. **A solution to this problem is the application of a heat exchanger, creating adequate subcooling, and resulting in a solid stream of liquid entering the thermo valve.**

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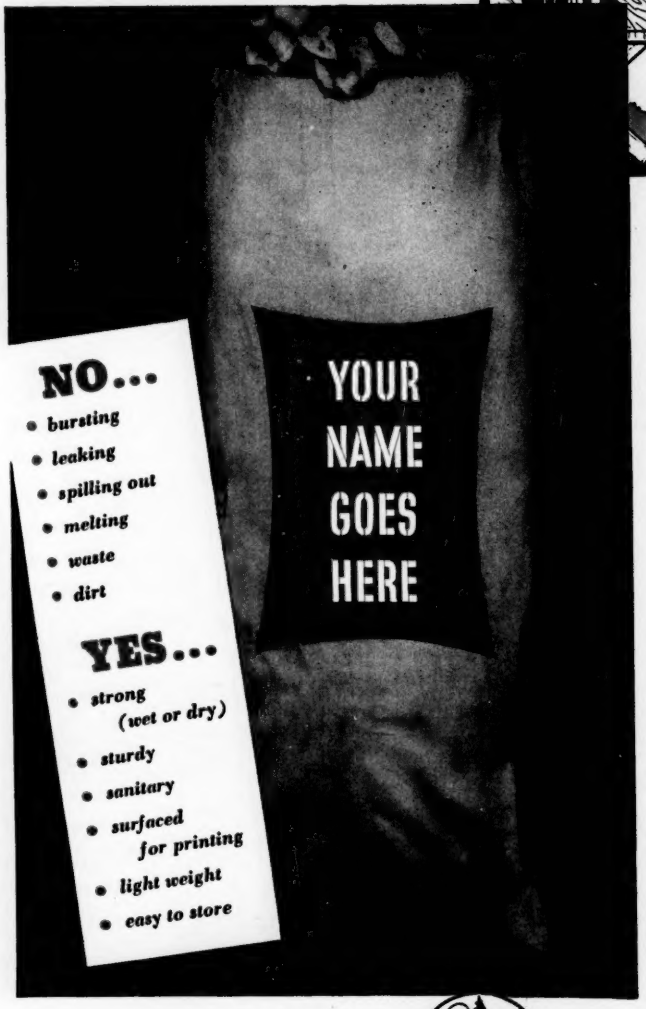
76% of your CUSTOMERS want ICE CUBES in this type BAG*



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"ICE & REFRIGERATION" SURVEY PROVES CUSTOMERS PREFER WET STRENGTH ICE BAGS.

Of 3937 mechanical refrigerator owners asked, 2992 chose wet strength paper bags as the most practical ice cube package. Deliver your cubes in the best . . . International Hydrotuf.* They're easy to carry, neat to use, and they keep ice longer.

International ice bags save your time too—store flat, fill easily and seal tight with a twist. Build new business this summer with the ice bag that's away ahead in convenience and popularity.

KEEP YOUR PRODUCT AND SERVICE SOLD.

The bag you use for ice cubes is part and parcel of your service when signed with your name and advertising message. Make sure it's an International bag.

*Reg. Trade Mark

INTERNATIONAL PAPER COMPANY
SOUTHERN KRAFT DIVISION — NEW YORK-CHICAGO

In The Spotlight

MECHANICAL cooling equipment for refrigerator cars designed and tested by the Santa Fe Railway Company is described in the article on page 13. Road tests and tests of loading space demonstrated its ability to obtain and hold uniform temperature and humidity conditions.

CONCRETE made the conventional way requires coarse and fine aggregate, usually gravel and sand. Now the Bureau of Standards announces a new process in which air bubbles are substituted for sand. For details see article on page 17.

STATISTICAL RECORDS of a business operation are important as a source of information upon which to base careful planning. The details of such record keeping for an ice manufacturing and distributing operation, with sample printed forms, are given in the article starting on page 19.

THE COOLER STORAGE installed in a limestone mine near Kansas City in 1944, during the World War II emergency, is to be closed according to a news report from Washington. Details on page 29.

AIR CONDITIONING of existing buildings presents problems that are different from those of new installations. How those which arose in connection with an installation in a Philadelphia hotel were met are detailed in the article on page 31.

NEW ICE PRICE regulations have been issued by the Office of Price Stabilization effective August 1, to be administered by Regional and District offices of OPS. Summary of the order and comments are published in the article starting on page 41.

FROZEN FOOD processing is more profitable than canning, according to a survey by the United States Department of Agriculture.

COVER PICTURE: In a two-story recess atop Pittsburgh's newest and largest skyscraper is this 97-foot long cooling tower, part of the multi-million-dollar air conditioning system which will provide the building's 4200 occupants with the ultimate in man-made weather. This tower built of redwood with brass bolts and copper nails, handles about 7650 gallons of condenser water per minute, dropping its temperature about 10 degrees. The condenser water is used in refrigeration equipment in the third basement of the 41-story building, occupied by U. S. Steel Company and Mellon National Bank & Trust Co. Four huge stainless steel fans powered by 30-horsepower motors blow air on the condenser water to cool it. The tower was recessed in the building so as not to detract from the structure's architectural appearance.

ICE PUBLICITY in magazines and newspapers hit a new high at the peak of the ice season this summer, with pictures in full color and articles playing up the attractiveness and advantages of ice. The outstanding contributions are reviewed in the article on page 44.

THE SUPERVISOR is one of the most important cogs in the organization of an ice distributing company. If well trained, he can take over much of management's responsibilities. An experienced ice man company manager has his say on this subject on page 47.

UNBLANCHED peas held in cold storage develop undesirable off-flavors. To determine the cause and extent of these off-flavors, an investigation was undertaken at the New York Experiment Station. The results are summarized in the article on page 55.

FROZEN FOOD locker plants in the United States on January 1, 1950 numbered 11,442, according to the U. S. Department of Agriculture. These plants serve 3.9 million locker patrons and 440 thousand home unit owners not renting lockers.

60 Years Ago

From the September, 1891 issue of ICE AND REFRIGERATION

THE SOUTHWEST Ice Manufacturers' Association was organized April 23, 1891 at a meeting of six ice plant representatives at Joplin, Mo. W. O. Caldwell was elected president and C. M. Gay secretary. A resolution was passed by which the members agreed to abstain from selling ice in towns other than their own occupied by plants accepting this agreement and that each plant be permitted to establish their own prices.

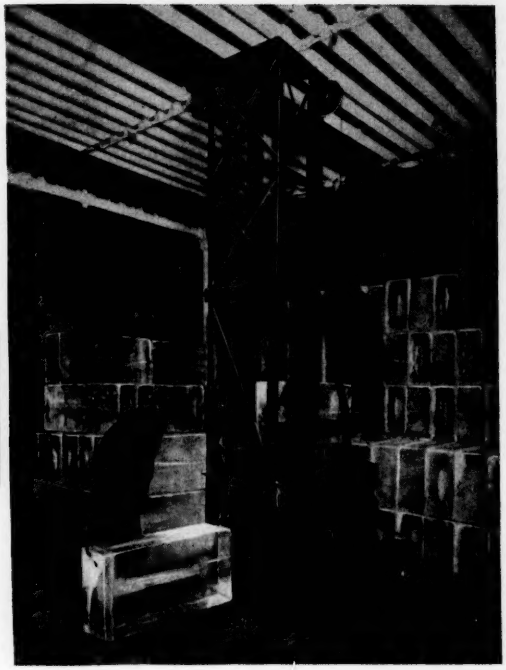
RAILWAY refrigeration is discussed in an article which states that refrigeration applied to railway and steamship transportation has opened up new lines of commerce between nations and developed the greater resources of sections of our own country, without which their characteristic products would be practically worthless.

AN ARTICLE on egg storage by D. B. Beemer states that his experience had been that the best temperature is 34 to 35 F. None of the present systems of cold storage using natural ice, he says, had yet attained the degree of dryness of air that would enable them to carry eggs successfully for longer than four to six months.

DURING the hot days of August, 51 large three and four masted schooners were reported loading and awaiting a cargo of ice along the Kennebec river at Gardiner, Me.

A RESTAURANT and beer hall in St. Louis, located on a refrigerated pipe line of the St. Louis Automatic Refrigeration Company was being "air conditioned" with cold air from the pipe line. It had been named the "Ice Palace," and interior decorations carried out this idea with murals of the Kane Polar Expedition and sleighing parties.

THE ICE SEASON of 1890 had most unfortunate results, says a correspondent writing from Birmingham, Ala. The previous winter had been an open one and very little ice was harvested in the north. The supply was not equal to the demand and increased prices followed, also greatly increased sales of ice-making equipment. As a result, the following summer there was over production with accompanying decreased profits for many ice plants which had expanded.



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T038

COOLING OF REFRIGERATOR CARS

Tests of mechanical refrigeration equipment installed in standard refrigerator car demonstrates ability to obtain and maintain uniform temperature and humidity conditions

J. F. DALY
Manager Ice Plants,
Atchison, Topeka & Santa Fe
Railway Company

Although ice has been doing a good job of maintaining temperature and humidity conditions in refrigerator cars, mechanical equipment for this purpose has been the subject of much speculation and many tests. The accompanying article describes equipment designed and tested on the Santa Fe railroad to provide controlled temperatures and humidity.

TO HANDLE the tremendous crops of perishables now required to feed the country's population, freezing, precooling, storage, and ice plants have been installed in great numbers and in all sizes from household refrigerators to huge railway icing stations.

Transporting these products requires a railway refrigerator car population of approximately 130,000 cars which use ice as a refrigerant. Ice has the merits of being almost universally available at comparatively low cost and certainly is not subject to mechanical disorders, and for most commodities, the use of ice in well constructed cars provides a satisfactory means of refrigeration.

With built-in fans fairly uniform temperatures can be maintained. Frequently, stationary or portable precooling equipment is employed to remove field heat quickly to permit harvesting at more mature conditions. Crate-icing and top-icing continue to be the most promising methods of preserving green vegetables under the best temperature and humidity conditions.

The increasing use of frozen foods and other products which require either very low temperatures or special handling has prompted a great deal of investigation into the advantages and disadvantages of refrigerator cars using some source of refrigeration other than ice. Immediately following World War II the Santa Fe Railway embarked on a long-range project to investigate any feasible plan of improving railway refrigeration, and to try out schemes which appeared sound enough to warrant development.

Of course, other investigations had been conducted throughout the history of refrigerator cars but ice had been doing a good job on most commodities and had been doing it on a reasonably economical basis.

Mechanical Equipment Is Investigated

With the increase in rather specialized shipments, the changes in the economic structure and the development of improved equipment, it was felt that the time had been reached when the problem should be vigorously attacked; consequently we established a broad specification which required that the equipment must fit into a regular refrigerator car with no basic change in dimensions or structure of the car.

Obviously, it had to withstand extreme weather conditions and take shocks incidental to railroad service. It was to perform three principal functions; first, to precool a hot load of produce in accordance with the accepted practice which means averaging six tons of refrigeration the first twenty-four hours; second, it was to maintain a frozen load at minus ten degrees even against extreme ambient temperatures; and third, it was to carry a produce load at the most desirable conditions of temperature and humidity according to best cold storage practice for any product ranging from chilled meats to bananas.

The equipment was to operate entirely automatically between the initial start and the final shut-down of each trip. It was to be independent of the locomotive or any external source of power and was to show promise of being economically sound in the long-range picture.

We investigated and are continuing to investigate many plans including absorption systems, compression systems, staging systems and even an occasional system where we haven't yet quite figured out how it would work without changing the laws of thermodynamics.

I shall describe the car and installation briefly and present a summary of test results to date.

Installation of Equipment

The equipment was installed in a standard forty-foot car with three inches of insulation on the sides and ends and three and one-half inches on the roof and floor. This car was selected to permit us to test any load and to subject the unit to less favorable conditions than would obtain in a super-insulated car.

Ice bunkers were omitted and the two bunker spaces were consolidated in the machinery end of the car. No other significant structural changes were made except that a perforated false ceiling was placed six inches under the regular ceiling to provide a plenum chamber above the load. There are 590 equally spaced holes in the false ceiling, sized to maintain a slight pressure in the duct space so that equal air distribution is maintained.

The machinery consists of a six-cylinder diesel engine rated at 52 horsepower at 1200 rpm, this being the constant speed at which the equipment operates continuously in service. A 220 volt, 15 kw alternator is direct connected to the engine and provides energy for the condenser and evaporator fans and for electric heaters for defrosting and for protective service in cold weather.

A vertical four-cylinder, Freon-12 compressor was selected. At minus 20 degrees suction and 120 degrees condensing it provides nearly 33,000 Btu's per hour for frozen food handling and is rated about 16 tons at the conditions prevailing at the start of precooling of fresh produce.

An eddy-current clutch between the generator and compressor operates according to refrigerating demand to cycle the compressor.

An axi-flow condenser fan takes in air through one side of the car and discharges it from the other side after passing it through the condenser and engine radiator.

The evaporator coil is located in an insulated chamber and two overhead fans pull air up through the coil discharging it through the plenum-duct

A paper presented at annual convention of National Association of Practical Refrigerating Engineers November 29, 1950.

down through the load and back under the floor racks to the coil.

Storage batteries under the car provide for engine starting and for the control circuit, and under-car fuel tanks having a capacity of 300 gallons permit operation eight days or more without refueling.

A selector switch sets the controls for either fresh or frozen food. A thermostat can be set to control the load temperature at the desired level. In the event heat is required, the controls energize a number of electric heaters spaced in the evaporator coil.

Defrost Cycle

When frost builds up to the point where the efficiency of the coil is impaired, a differential pressure switch, with its taps located above and below the coil, acts to initiate a defrost cycle. The same electric heaters melt off the frost for a predetermined time interval. The evaporator fans shut down during defrost; otherwise they operate continuously to maintain uniform temperatures whether heating, cooling or neither is in progress. Protective devices shut down the equipment in the event of motor overloads, loss of oil pressure, generator voltage or excessive engine temperature. All capacities and surfaces were made very liberal to provide a reserve against wear and fouling and occasional extreme conditions.

On the whole, the design has been satisfactory to carry out our objective which was to make a thorough trial of the whole idea of mechanical refrigeration applied to railway cars. As a result of our experiences during installation and testing of the equipment we would, however, make some re-arrangement of equipment and attempt to clean up some of the design details but we definitely would not favor any material deviation from the capacities embodied in the present equipment.

Road Tests

Tests on the car have been in progress for more than a year. A rather extensive program was carried out first to verify the performance of the various components and to insure proper functioning of the controls. Among other experiments, the car coasting at ten miles per hour with the equipment operating was permitted to strike five cars loaded with steel plate. There was no damage to the mechanical unit—or to the steel.

Early this year road tests were started on our lines. A business car to house the test personnel was obtained and test instruments were so selected and arranged that practically all readings could be made from within the business car or from its platform.

Customary temperatures and pressures of the machinery were taken including suction, discharge, condenser, evaporator, and oil pressures. Engine crankcase, and coolant temperatures, suction and discharge and engine room temperatures were read, in most cases, with thermocouples and potentiometers. Static pressure tubes and manometers were provided to obtain static air pressures at various points within the loading space for observing fan performance and the effects of various loads. A tachometer and odometer were connected to the engine, and whenever desired, voltmeters could be connected to check alternating or direct current voltages.

Readings were made every two hours or more frequently when considered desirable. We feel, therefore, that we have a good idea of what was going on in the engine room under the great variety of weather we encountered and all indications were that conditions were in accordance with good operating practice.

Regardless of the equipment and the extent of the instrumentation of the mechanical components, naturally the big question is: "What did all this do to the load?"

Tests of Loading Space

To find out what was happening in the loading space we selected a dynalog recorder, selector switch, resistance thermometers, dewcels and necessary cables. The selector switch handles seventy-two resistance bulbs and transmits their temperatures to the dynalog where a permanent record is made on a circular chart.

When action is initiated through a switch the selector automatically permits the recorder pen to draw a line for five seconds to record the temperature felt by Bulb 1. Then the selector automatically picks out Bulb 2 and its temperature is recorded. This continues for the remaining bulbs in order until all seventy-two have transmitted their message. In six minutes the reading is completed and the chart can be changed and the process repeated by flicking the starting switch.

With over 100,000 oranges in a typical load and around 50,000 packages of frozen food in a car, obviously a large number of thermometers should be employed adequately to explore the load. We selected forty-five as a reasonably practicable number to use in the product itself; fifteen were placed in the product about a foot above the floor racks, fifteen about a foot below the top of the load and fifteen midway between. These were in selected transverse planes throughout the load. Air temperatures were taken above and below the load and at positions to give temperature and humidity conditions to and from the coil. Dewcel instruments were employed to yield dew-point temperatures. Despite the apparent complexity of the test equipment, it performed without failure.

Car Loaded With Oranges

For the first road test a standard load of oranges was placed in the car near Riverside at an average initial temperature of 64 F. It was desired to maintain a temperature of 40 F. An average temperature of 45 F was reached in about seven hours and the temperature was 38.7 F at unloading in Chicago. There was less than one degree difference between top and bottom oranges and no appreciable variations from end to end or side to side of the car.

The test was started on January 30 and, of course, no hot weather was encountered but there is no doubt that the load could have been easily controlled uniformly at 40 F in hot weather merely by more cycling of the compressor. Humidity in the car was maintained between 85 and 95 percent throughout the trip. Generous amounts of coil and air resulted in small temperature differences between the boiling Freon and circulating air and between the discharge and return air.

On the return trip a less than carload test was made between Kansas City and Belen. Normally a car of this type would not be used in such service but the light load resulted in short but frequent heating or cooling cycles and afforded an excellent opportunity to study the action of the controls involved. The desired temperature of 36 F was consistently maintained.

From Belen to Los Angeles a run was made with the car empty but operating on the frozen food controls. A minimum average temperature of minus 30 F was obtained against an outside temperature of 25½ with a light solar load. At the maximum outside temperature of 86 F, a minus 18 F was maintained in the empty car.

In February a second eastward trip was made, this time with grapes from the San Joaquin Valley to Chicago. The load consisted of over 33,000 lbs. of grapes harvested in October and held in storage at 31 F until loading.

This is approaching the limit of storage life of the product and poor control of temperature and humidity would be reflected in the condition of the grapes. A temperature between 34 and 35 F was to be maintained.

This was accomplished within close limits and the average load temperature at the time of unloading was 34.8 F with the individual readings very uniform throughout the car. Humidity was again maintained at an average of about 90 per cent. Ten per cent of the boxes of grapes were weighed at loading and the same boxes weighed at unloading. Average initial weight of the boxes was 31.78 lbs and the average loss was 0.06 lbs or two-tenths of a per cent. If we are willing to install sufficient coil and air circulating capacity there is no reason the product should be dehydrated.

In March the car was started from Modesto, Calif., for Chicago with 42,300 lbs of frozen lima beans. Side wall racks had been installed so the circulating air could sweep the walls of the car. The beans had been in storage at minus 17 F but warmed slightly during loading operations. The final temperature reading before unloading at destination was minus 23.2 F.

These tests were considered representative of the capabilities of the apparatus under varied demands of heating, cooling, and merely idling but to ascertain the temperature obtainable in hot weather a second frozen food test was conducted in August from Modesto to Chicago. The product was minus 12 F in the storage room and was at minus 11.2 F when unloaded at destination. Outside temperatures as high as 110 F were experienced but the equipment demonstrated ample capacity to take care of these conditions.

Subsequently, an extended stationary test was conducted with twenty tons of ice as the load. The ice was cooled from 29 to minus 15.5 F but the test was continued at various temperature levels and with minor adjustments to check operation of controls and particularly to permit visual observation of the defrost cycle under a variety of conditions.

Results of Test

The highest average rate of fuel consumption during the program was one and a half gallons per hour during the frozen test in hot weather. Other than relatively minor alterations made as a result of the information accumulated or to improve small design details no major overhauls or replacements were made. The equipment withstood the shocks experienced in normal handling at the end of long freight trains.

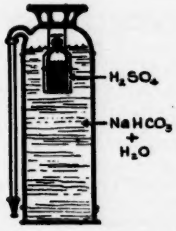
No major mechanical difficulties developed and it is our opinion the equipment clearly demonstrated its ability to obtain and hold uniform conditions of temperatures and humidity throughout the car in normal service. The engine has operated about 1500 hours; the longest sustained run being 267 hours during which time the compressor and fans also operated except during periods when the defrost cycle was in progress.

Because the car has been on a test status and serviced by test personnel no regular service or maintenance schedule has been carried out as would be in actual operation, and pending final design of any future cars which might be built, it is difficult to arrive at the first cost of actual service units in reasonably large numbers. Therefore, we are unable to offer any data as to the economics of this car but we believe we have established that the technical difficulties can be solved.

Another question which has frequently been asked is, "What happens in the event of machine failure?" We have learned that if the machine can maintain a minus ten or lower temperature in hot weather, we are assured of a safe period of from about 30 to 48 hours or more, depending on the weather, to reach a station where necessary steps can be taken before the inside temperatures reach a point higher than those reached in a super-insulated, ice and 30 per cent salt car.

More Vigilance Needed to Prevent Fires

ALL construction materials, building equipment and machinery are in tight supply. A fire that consumes or destroys a plant would put everyone connected with it out of work for an extended period. It might go further than this to wreck the business and cause its permanent closing.



These are added reasons why precautions against fire should be redoubled at the present time by everyone. All the other regular and valid reasons remain for observing safety precautions and maintaining conditions which do not in themselves make the occurrence of fires easy or likely. A good discussion of fire causes and prevention was printed in ICE AND REFRIGERATION, April 1951, page 19.

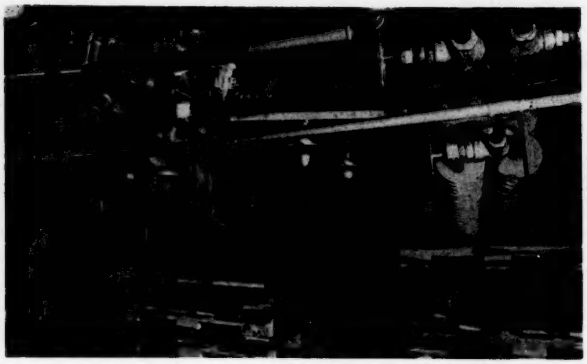
Homes, schools, industrial plants, offices, amusement areas — places which are frequented by each of us in the course of a day—are all places which could become scenes of destructive fires. Despite all precautions, fire is still a usual possibility and we should remember that the brass fire extinguishers hanging on the walls of most of these places are there for use. They are certainly not designed as part of the decorations, but at the right moment they can avert disaster.

The most widely used fire extinguishers are the soda and acid type. They usually have a two and a half gallon capacity and are constructed with compartments for the storing of two chemicals responsible for their operation. Upon mixing, these two chemicals cause the extinguishers contents to be expelled through a small hose.

The upper left hand drawing represents a cross section of the soda and acid type. A small bottle contains sulfuric acid (H_2SO_4), and the barrel contains a mixture of bicarbonate of soda ($NaHCO_3$) and water (H_2O). In the event of fire it is only necessary to carry the extinguisher to the scene by the top handle and then

invert it. The hose is directed toward the base of the flame and when the two chemicals mix as the extinguisher is inverted, pressure created through the liberation of large quantities of carbon dioxide causes a stream of solution to be expelled.

Break in Ammonia Pipes Causes Damage In Refrigerated Warehouse



Cooling coils fell in this refrigerated warehouse when hanger bolts loosened and pulled out of the ceiling. The break in ammonia pipe that resulted is at the left. Escaping ammonia damaged more than $32,000 worth of food.

SERIOUS accidents usually get newspaper attention, says an article in a recent issue of "The Locomotive," published by the Hartford Steam Boiler Inspection & Insurance Co. But many big accidents to refrigerating systems go unreported because there is no violent explosion, no vessels burst, no building walls are blown out. There's no wreckage to make a good news photo. Even the cause of the failure may be too dull for news coverage. There may be no failure of safety devices, no operating errors, no overpressure.

In such accidents, the damage to the system itself often amounts to no more than a broken pipe nipple, snapped off when struck by a hand-truck; or a cracked cooling coil, damaged when hit with a hammer while removing frost; or a broken pipe line, fractured when dropped to the floor by the failure of a few hanger bolts.

Cost Is High

The cost of such accidents is the only spectacular thing about them. And the cost can run into thousands of dollars, as it did when evaporating coils dropped from the ceiling of a cold storage warehouse recently. Hanger bolts, holding the coils to the ceiling, failed. The coils fell and the ammonia piping broke at a tee connection. Escaping ammonia did the rest of the damage. Food products valued at more than $32,000 were spoiled by ammonia fumes that escaped through the break.

Stopping Seepage of Moisture Through Below-Grade Walls

THE seepage of moisture through walls of below-grade rooms converted to cold storage can have costly consequences unless the condition is corrected before insulation is applied. Sealing the walls from the outside is recommended in most cases. Occasionally, however, walls are located so that digging around them and applying exterior moisture-proofing is impossible.

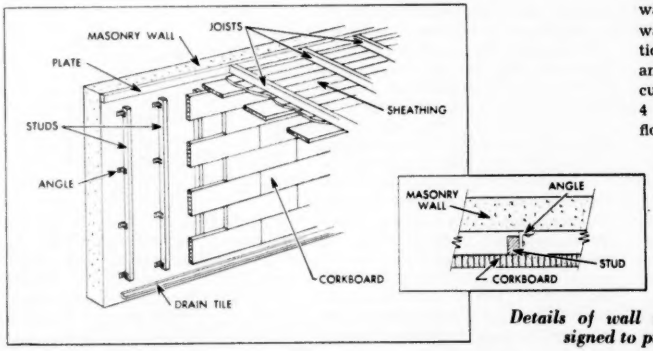
Reprinted from The Insulator, Armstrong Cork Co.

A case in point is a cold storage room completed for Klein's Sea Foods, Akron, Ohio. Two freezers and a cooler were constructed in an existing building, three walls of which extend about nine feet below grade. Seepage could not be stopped externally because the walls were right on the property line.

To meet these conditions a heavy coat of back plaster was first applied to the inner surface of the walls, followed by a heavy coat of No. 3 asphalt paint. This vapor-proofing keeps most moisture out.

To offset the moisture that does get through, an air space was provided between the insulation and the sealed walls by installing 2 x 4 vertical studs against the walls on 12 in. centers. These studs were anchored by angle clips bolted so that the studs set out about 1 in. from the walls. All studs were cut off 6 inches above the floor line and 4 inches below the ceiling line and the ceiling sheathing was stopped 4 inches back from the walls to assure complete air circulation in the space between the wall and the insulation. Drainage of accumulated water is provided by a 4 inch trough at the intersection of floor and walls.

The first layer of corkboard was dipped in hot asphalt and then nailed to the studs. The vapor seal provided by the asphalt and the moisture resistance of corkboard further protected storage areas from moisture infiltration.



Details of wall construction and insulation designed to prevent seepage of moisture.

AIR FOR SAND IN CONCRETE MIX

National Bureau of Standards announces new method of mixing lightweight concrete in which air takes the place of sand, but with reduced density and thermal conductivity.

A LIGHTWEIGHT concrete recently developed by R. C. Valore, Jr. and W. C. Green of the National Bureau of Standards substitutes air bubbles for sand. Suitable for the construction of monolithic walls and other elements of small structures, this "air-gravel concrete" grew out of a request from the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering for a material particularly adaptable to farm buildings.[1] The many tiny air bubbles enclosed within the material not only replace the sand used in ordinary dense concrete, but also make the product lighter in weight, a better insulator against heat and cold, and more resistant to water penetration.

Concrete normally contains a coarse aggregate such as gravel or crushed stone held together by a binder of mortar consisting of sand and cement-water paste. In the air-gravel concrete the fine aggregate or sand is replaced by air bubbles, which act as a "lubricant" and produce a very workable mixture. High-air-content concrete is prepared in conventional mixing equipment in the normal way, except that an industrial aerating agent or a detergent is added to the mix to cause it to foam by entraining finely-divided air cells in the cement-water paste. Entrained air may constitute up to 45 percent of the volume of the concrete prepared at the Bureau, and "pea gravel" forms the dense aggregate.

Air Produces Workability

One of the important functions of fine aggregate sand in conventional concrete is to produce workability, which facilitates placing in forms and assures homogeneity in structural members. Results of an investigation at NBS indicate that the replacement of conventional fine aggregate by entrained air likewise produces workable mixtures having relatively low water-cement ratios.

The mixtures studied consisted of a high-early-strength portland cement, siliceous pea gravel (No. 4 to ⅜-in. sieve fraction), water, and an air-entraining agent. Two different air-entraining agents (foam stabilizers) were used: agent V, a proprietary neutralized resin; and agent X, a proprietary sodium lauryl sulfate-type detergent[2]. The falling action of the gravel particles during mixing in an ordinary rotating tilt-drum mixer produced the entrainment of air in the cement-water paste, and the air-entraining agent rendered the foamed paste stable.

The capillary rise of water in the NBS air-gravel concrete is relatively lower than that for dense concretes. In these four lightweight specimens (1 x 8 x 8 in.) immersed to a depth of ¼ inches, the rise was less than 2 inches after seven days, compared to 4 inches for like specimens of nonaerated sand-gravel concrete.

Air Contents

Air contents as high as 45 percent were found possible in concretes containing no sand, while there appeared to be a "ceiling" of about 30 percent in the air content of experimental mixtures containing both sand and gravel. However, the amount of entrained air, upon which the density depends, was limited critically by the minimum compressive strength requirement of 500 lb/in². The lowest cement content permitting the attainment of the required strength in an "air-gravel" concrete was about 3¼ bags of cement per cu yd of concrete. In this "lean" mix (mix A) it was necessary to maintain an air content of about 25 percent to provide the necessary workability and strength. A second mix (mix C), containing about 5.6 bags of cement per cu yd of concrete, provided the required strength for air contents as high as 29 percent.

Compressive Strength

The compressive strength was sensitive to variations in air content; an increase of 1 percent in air content was generally accompanied by a decrease of about 100 lb/in² in compressive strength for both mix A and mix C. The indicated density of concretes having a compressive strength at 28 days of 500 lb/in² was about 113 lb/cu ft for mix A, and 105 and 109 lb/cu ft respectively for mix C concretes made with the resin and detergent air-entraining agents, as compared with 140 to 145 lb/cu ft for conventional (nonaerated) sand-gravel concretes. While the compressive strengths were only one-fourth to one-fifth the values obtained for nonaerated concretes, the moisture properties and thermal conductivity of the air-gravel concretes compared favorably with the values obtained for the denser concretes.

The mean water absorption of the lightweight concretes upon soaking for 24 hours at room temperature was

[1]For further technical details see Air Replaces Sand in "No Fines" Concrete, by Rudolph C. Valore, Jr. and William C. Green, Journal of American Concrete Institute, June 1951. Vol. 47, p. 833.

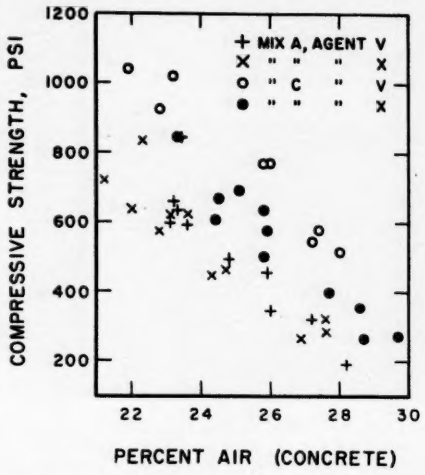
[2]Editors Note: Among the detergents of this type are Duponal (Du Pont) and others.

about 9 percent (by volume) for all mixes, compared with 11 to 15 percent for conventional concretes of similar materials and cement contents. Saturation coefficients, calculated as the ratio of the 24-hour room temperature absorption, to the 5-hour boiling absorption, ranged from 0.22 to 0.36, or about one-third the magnitude of values previously reported for nonaerated sand-gravel concretes. The saturation coefficient purports to represent the ratio of the pore volume easily filled by water to total pore volume. The drying shrinkage of the air-gravel concretes did not differ significantly from values obtained for nonaerated sand-gravel concretes, ranging from 0.04 to 0.07 percent for 2- by 12-in prisms after 180 days drying.

Of 13 specimens of mix A and mix C concretes subjected to 100 cycles of laboratory freezing (0 F air) and thawing (70 F water), only one specimen (mix C) failed at 40 cycles. Two specimens of nonaerated sand-gravel concrete failed at 60 cycles.

The thermal conductivity of these concretes, as determined in the NBS guarded hot-plate test, ranged from about 5 to 6 Btu per hr per sq ft per deg.; a value obtained in tests of a nonaerated sand-gravel concrete was 9. A value often cited for conventional concretes is 12, but values ranging from 7 to 16 have been reported by various observers.

The air-gravel concretes developed at the National Bureau of Standards are considered experimental at the present time. The advantages in reduced density and thermal conductivity are appreciable but are gained only at a great sacrifice in strength. Greater advantages might be gained with higher cement contents and higher air contents, but the relatively high density of conventional aggregates imposes certain limits. The use of lightweight aggregates blended with dense aggregates in relatively high-air-content concretes may be a means of obtaining worth-while reductions in density and thermal conductivity while maintaining low-order drying shrinkages.



Graph showing the compressive strength of air-gravel concrete. The compressive strengths of 6 by 12 in. test cylinders, at the age of twenty-eight days, are plotted against the air content of the concrete.

Tax Amortizations Issued For Food Storages

CERTIFICATES of necessity for accelerated tax amortization on new food storage facilities have been issued by the Defense Production Administration to the following refrigerated warehouses:

Hudson Refrigerating Co., Jersey City, N. J. military storage facilities. Applied for $726,325, of which 65 percent was certified.

Merchants Terminal Corp., Baltimore, Md., military storage facilities. Applied for $2,250,000 of which 65 percent was certified.

Cattle Rustling Comes Back

CATTLE rustling is on the increase throughout the United States and the FBI is asking all who may be concerned to help stamp it out, according to N.A.R.W. "Cold Facts." It is a violation of federal law to receive, store, or sell cattle which have been transported across state lines and which are known to be stolen.

Refrigerators Hold Vast Stores of Microorganisms

SIX ordinary refrigerators at the Northern Research Laboratory of the Department of Agriculture at Peoria, Ill., hold a collection of 6,000 strains of microorganisms — yeasts, molds, and bacteria — probably the largest in the world. Scientists say this treasure may some day prove more valuable than all the gold mined in history, and worth more than gold in the saving of lives.

The strain of mold from which all of the world's penicillin now is produced came from this collection. Another organism is capable of producing a new kind of streptomycin. Still another shows great promise as a producer of the newest vitamin, B 12, a weapon against the ancient disease pernicious anemia.

The microorganisms in the Peoria collection have been screened from thousands collected throughout the world. Scientists constantly are gathering new ones from the soil and from manure, spoiled fruit and other foods, from stagnant water. Industry has invested hundreds of millions of dollars in plants to extract and refine substances the microorganisms produce.

Dr. Kenneth B. Raper and his coworkers at Peoria constantly screen new specimens as they arrive and catalog them. They keep going over the specimens to discover whether they possess new powers that might be valuable.

Court Says Employers May Lock Out Workers

A FAR-REACHING principle that employers may lay off and lockout workers without penalty was established in a recent decision by the U. S. Court of Appeals in Chicago. As a result the power of management is in balance with the power of unions. Federal Judges Otto Kerner and Walter C. Lindley gave the ruling. Their decision has focused attention on the long established lockout practice.

The case reversed a National Labor Relations Board finding that the Illinois Wholesale Liquor Dealers Association was guilty of an unfair labor practice. When contract negotiations between the union and the association broke down, the union struck against one member of the group. The remaining firms promptly suspended all their union salesmen, and this action was held legal by the U. S. Court of Appeals.

RECORDS CHART YOUR BUSINESS

Statistical records of business operations are a necessity as a means of careful planning for today and tomorrow based upon the business experiences of the past

CLARENCE A. HINES
Belle Ewart Ice & Fuel Co.
Toronto, Canada

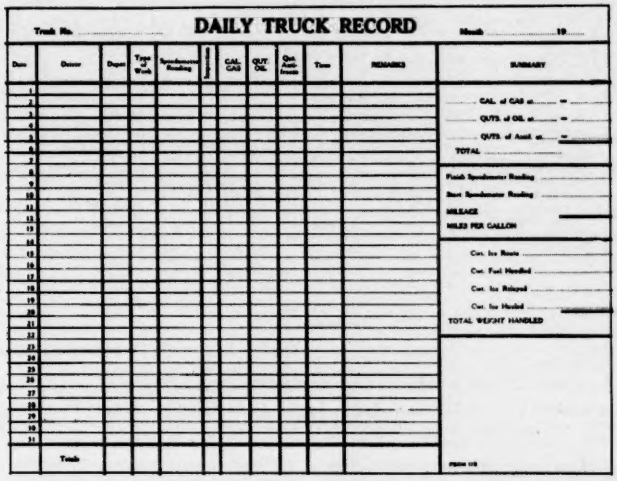
YOUR records are your most valuable asset, for without them you cannot properly chart your business and you have no adequate guide for the future. Today as never before your business must be run with efficiency, all wastage be eliminated, shortages be cut down and expenses be kept within reasonable limits. With prices soaring on all supplies such as gasoline, oil, repairs and truck parts, tools, building materials, uniforms, taxes, etc., not to mention wages, it is imperative that we look into our operations and ask ourselves these questions. Is there anywhere that I can cut expense? Am I getting all the production possible from my manufacturing methods? Are my drivers making full returns for all ice taken from yard? Is there any conversion of retail ice to wholesale rates?

The ice business, unfortunately, has a price ceiling imposed upon it by the mechanical refrigerator industry. We cannot raise our prices too high or we will send our best customers right into the hands of the equipment salesmen. However, if we, in this day of increasing costs, cannot raise our prices as high as we desire, one other course is open to us, whereby we may still make a good profit and that is by careful cost analysis to see in which way savings may be made.

Printed forms are not always necessary and mimeographed forms are inexpensive and versatile, especially when in the course of design. New forms made up by mimeograph in small quantities and put into use can then be printed as soon as there are no further changes required. It is really amazing how far you can go in using mimeographed forms for most statistical work.

Sales Records

Sales records usually start with the drivers daily report envelope, or in some cases, only a report sheet is necessary. All drivers should make out a daily report of ice taken from the yard, sold and returned. Unless the proprietor is also the storageman,



DAILY TRUCK RECORD

Truck No. ..... Month ..... 19....

Date	Driver	Depot	Type of Work	Speedometer Reading	Speedometer	CAL. GAS	QUT. OIL	Qts. Anti-Freeze	Time	REMARKS
1										
2										
3										
4										
5										
6										
7										
8										
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25										
26										
27										
28										
29										
30										
31										
	Totals									

SUMMARY

CAL. of CAS at ..... =
QUTS. of OIL at ..... =
QUTS. of Anti. at ..... =
TOTAL .....

Finish Speedometer Reading .....
Start Speedometer Reading .....
MILEAGE .....
MILES PER GALLON .....

Cwt. Ice Route .....
Cwt. Fuel Handled .....
Cwt. Ice Relayed .....
Cwt. Ice Hauled .....
TOTAL WEIGHT HANDLED .....

Daily truck record giving complete details on truck operations, reduced from 8½x11 inches.

a yard ticket should be used, made out in the office and given to the driver who in turn gives it to the storageman for his load of ice; returned ice being handled in a similar manner with the storageman giving the driver a credit note for returned ice which driver turns in at the office. This daily report should show ice out, less returned ice, also sales by classifications, tickets sold, cash received, etc. and should show short or over, so that shortages may be handled at end of day or week.

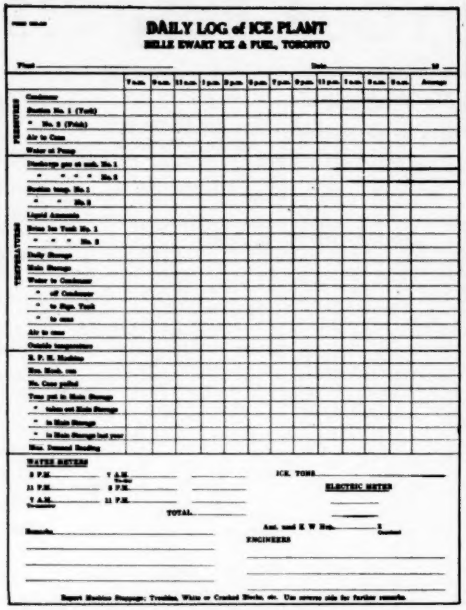
The next most important record is a summarization of ice sales by classifications. This is most necessary if we are to increase our sales volume and reveal any weaknesses on different routes. This information accumulated from year to year and compared week by week and month by month gradually builds up a wealth of statistical information which allows the proprietor to see if he is losing out in any particular territory, department of business such as sized ice, commercial ice or domestic ice.

In this connection the use of a simple graphic chart will assist in the intelligent interpretation of the accurate records kept, and tell at a glance whether progress is being made or business is being lost. This information should also be kept by weeks and months in relationship to the weather and records of daily averages, temperature weekly averages and monthly averages compared to see if sales are responding to temperature rises in the right ratio. Without these records to chart our course we cannot make comparisons which will give us the true information required.

Manufacturing Records

Records for controlling the manufacture of ice, namely: records of blocks manufactured, cans pulled, put in storage etc. are very necessary. Are we sure the tank room man is pulling the cans in order and doing the work he should do, so that the greatest efficiency is obtained and the most ice made for the expense involved. This is especially necessary on the night shift where men are usually without supervision and

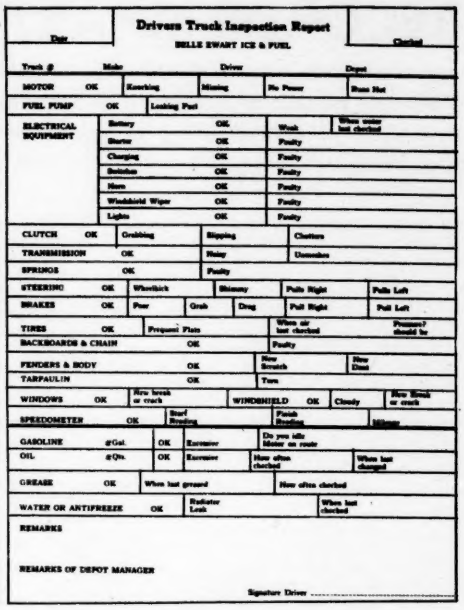
Summary of address at annual convention of Canadian Association of Ice Industries.



DAILY LOG of ICE PLANT

BELLE EWART ICE & FUEL, TORONTO

Daily log of ice plant showing pressures and temperatures and other essential operating data.



Drivers Truck Inspection Report

BELLE EWART ICE & FUEL

Drivers truck inspection report giving details on condition of each individual truck.

slackness may most easily result. The Log of Plant, and Record of Cans pulled will control this feature.

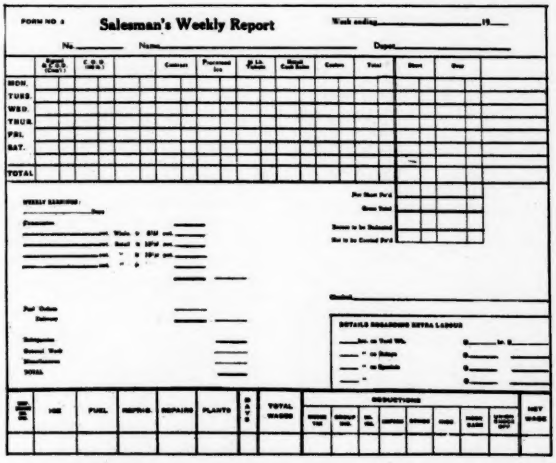
Our company uses several different forms covering the manufacture of ice where more than one plant is operated but with one plant only a very simple form will suffice. Ice manufactured each month should be checked against ice used by trucks, put into storage, sold at platform, etc. to see that normal shortages are being experienced, that ice allowances are not excessive, that the percentage for wastage, breakage, white blocks, briny blocks, etc. is not eating too large a hole in the profits. A few tons of ice saved each week by accurate record keeping may make the difference between a good yearly profit and a poor one.

Truck Operating

There is another record which is very revealing and that is the record of operation of all trucks as relates to gasoline, oil, repairs, etc. Such a book with a monthly sheet for each truck is invaluable for comparison as between drivers and will show such leaks as faulty equipment, stealing of gasoline for drivers' own cars, running around on their own business with company equipment, some drivers being known to operate moving and cartage business with company equipment after their route was done; also suburban drivers bringing in loads of sod on their return from route.

This record will also give valuable information as to comparative costs on different makes of trucks, for instance, whether a better class truck with infrequent repairs is cheaper in the long run than the lower priced vehicle with more frequent repairs, also between new and used equipment. How many years is it profitable to keep a truck? It is quite possible that without proper cost analysis to be paying for a new truck

(Continued on page 59)



Salesman's Weekly Report

Salesmen's weekly report showing summarized record of sales, expense details and other information.

New Ratings Announced for Maintenance Repair and Operating Supplies

MRO supplies are now under Regulations CMP 5 and 7 (Controlled Materials Plan) replacing DO-97 which has been revoked. All other provisions of National Production Authority Regulation 4 under which DO-97 was operative remain in force.

THE National Production Authority, U. S. Department of Commerce, on July 6 announced CMP Regulations 5 and 7, and simultaneously revoked NPA Regulation 4.

CMP Regulation 5, which replaces NPA Regulation 4, provides for acquisition of maintenance, repair and operating supplies under the Controlled Materials Plan, while CMP Regulation 7 does the same for parts and materials needed by repair shops.

Both of the new regulations provide self-allotment procedures to obtain materials for MRO and repair shop needs. No application to NPA is required.

CMP Regulation 5 is similar to NPA Regulation 4. (Regulation 4 provided for use of the DO-97 rating to obtain MRO supplies.) Under CMP Regulation 5, any business enterprise, local, State or Federal government agency or public or private institution may obtain the normal amounts of steel, copper, aluminum, and other materials required to keep its plants and property in repair and operation, and to make minor capital additions.

Use Allotment Symbol

CMP Regulation 5 authorizes use of the allotment symbol MRO to obtain controlled materials for these purposes. It also provides for the rating DO-MRO on delivery orders for other materials for the same use.

A major difference between CMP Regulation 5 and the former NPA Regulation 4 is that, under Regulation 5, manufacturers of "A" and "B" products to be used for maintenance, repair and operation will *not* extend the MRO symbols or the rating DO-MRO to obtain necessary materials, but will get them under procedures established by CMP Regulation 1.

Schedules I and II of CMP Regulation 5, which list the comparatively few materials which may *not* be obtained by use of the MRO symbols, are identical with those of NPA Regulation 4, except for addition of "Printed Matter."

An organization planning to apply the MRO symbols to orders for maintenance, repair and operating supplies must first compute its permitted quarterly quota of such materials. The standard base period for this calculation is the calendar year 1950, and the standard quarterly quota is 30 percent of MRO materials purchased during 1950, figured in terms of expenditures. An organization which operated on a fiscal year basis prior to March 1, 1951, may elect to take as its base period its last such year ending before that date.

Provision is made for seasonal quarterly quotas if a purchaser of MRO supplies prefers this method of operation. In such cases, the seasonal quota for any quarter is 120 percent of expenditures during the corresponding quarter of 1950.

Organizations not in operation in 1950, or during only a part of that year, will figure their permitted MRO quotas according to formulas described in the regulation.

A business enterprise, such as a repair shop, doing maintenance and repair work or installing minor capital additions for others may apply the MRO symbols to obtain materials, to the same extent that its customer would be entitled to apply them if he were doing the work himself. In such cases, the cost of materials so obtained is to be charged to the MRO quota of the customer.

Capital Addition Defined

A minor capital addition is defined in the regulation as an improvement or addition, the total cost of which, excluding labor, deos not exceed $750, and is of a kind carried by an organization as capital, according to established accounting practices in effect Dec. 31, 1950.

Under CMP Regulation 5, computatin of the cost of a minor capital addition must include the cost of all material, whether or not obtained by the use of an allotment symbol, or delivered at different times by different suppliers. If the addition or improvement involves construction of a type which requires authorization under NPA Order M-4, the procedure for obtaining materials outlined in the new regulation may not be used unless the authorization specifically provides for it.

By the terms of CMP Regulation 7, covering repair parts and materials for use by repair shops, a repairman doing work for others is limited in the amounts of controlled materials he may acquire under the regulation to (1) the amounts to which his customers' MRO allotment symbols may be extended, and/or (2) the amounts he actually needs in doing work for customers who are not entitled to establish MRO quotas under CMP Regulation 5 or other NPA regulations or orders which set up MRO quotas.

Use of Symbol Limited

In the latter case, his use of the allotment symbol RE, assigned to repair shops by Regulation 7, is limited to acquisition in any one calendar quarter of not more than the following quantities:

Carbon steel (including wrought iron), alloy steel (except stainless steel (to include not more than 3 tons of alloy steel and 1 ton of stainless steel) ..... 20 tons

Copper and copper-base alloy brass mill products, copper and copper-base alloy foundry products and powder ..... 500 pounds

Aluminum ..... 500 pounds

A repairman who requires copper wire mill products for functional uses in his repair and maintenance work may use the allotment symbol RE on orders for these products to the extent of his actual need for the materials on jobs for customers not entitled to an MRO quota, but *not* in any one quarter for more than $150 worth or 20 precent of what he used in his repair and maintenance work during 1950, whichever is greater.

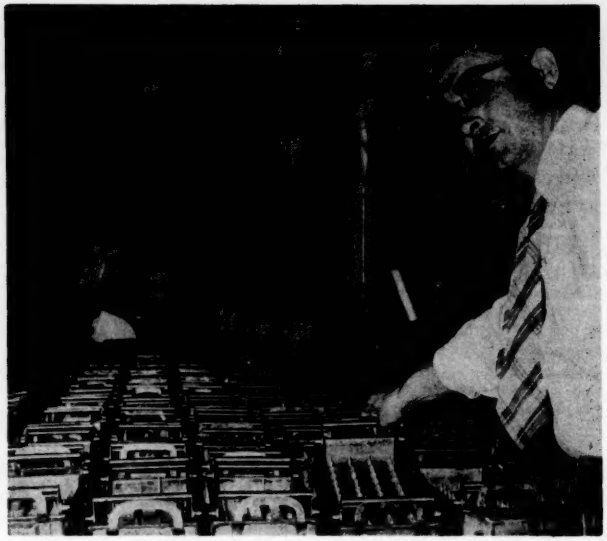
To obtain materials other than steel, copper or aluminum, a repairman may use the rating DO-RE on orders for amounts he actually needs in his work for customers who have *not* the right to use the DO-MRO rating.

To obtain other than controlled materials for jobs for customers who do have the right to the DO-MRO rating, the repairman must use that rating and not the DO-RE.

Both of these orders are permissive in character. No one is required to use the ratings if he can secure needed materials without them, but if he does use the ratings, he becomes subject to the limitations applied by the regulations. Those who elect to operate under these orders must secure the MRO or DO-MRO orders from commercial customers which, in turn, are extended to suppliers.

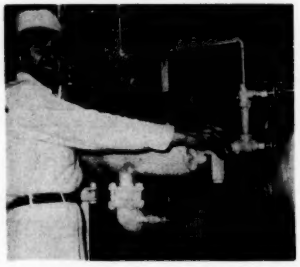
Further information concerning CMP Regulations 5 and 7 may be obtained from Department of Commerce field offices.

Dairy Plant Makes Ice Cream and Pop Pies the Modern Way



Calcium chloride solution has been added to this brine tank which contains product molds.

SINCE 1934 when George S. Coble entered the dairy business in North Carolina, he has expanded to processing stations and sales branches in five states, a total of 43 outlets, 17 receiving plants and 17 sales branches.



A large ice cream mixing tank.

Modern equipment enables the concern to mix ice cream at a rate of 2800 gallons per hour and to make 1250 gallons of ice cream in an hour. Pop pies are frozen at the rate of 2400 dozen per hour and a total of about 45 million ice cream novelties.

Pop Pies, a flavored frozen water novelty, are made by filling metal molds designed to make 24 pies per mold. The molds are moved by conveyors through four large open brine tanks. Temperature of the brine is maintained at 30 to 40 degrees below zero; this low temperature brine enables them to turn out about 750 dozen pies per tank per hour.

To bring the solution down to required temperature, two tons of calcium chloride are used in each large brine tank. Bob Cherry, plant manager at the Lexington, N. C., main office, says they use calcium chloride brine because it has excellent freezing resistance and that calcium chloride is easy to handle, and easy to store. They've been using it since they started in 1934.

Packaging ice cream.

Wrapping pop pies for small fry.

The brine strength is checked regularly and additional calcium chloride is added as needed. They use the standard method of dissolving flake calcium chloride in water, and then add the resulting solution to the brine tank.

Kansas City Studies Water Needs for Air Conditioning

USE of air conditioning in Kansas City, already heavier than in most cities, is increasing so rapidly that eventually such usage will have to be restricted or something will have to be done to supply additional water for air-conditioning equipment, according to Melvin P. Hatcher, director of the city water department.

Hatcher disclosed (July 28) that his department is considering construction of another pumping station adjacent to the downtown district to take care of the air conditioning demands on the system. Pointing out that Kansas City now is using about 20,000,000 gallons of water a day on hot days for air conditioning alone, with most of this in the downtown area, Hatcher said that if this demand should double, as trends indicate it may, more water will have to be pumped into the downtown district.

Although that could be done by installing additional mains from the city's Turkey Creek pumping station, he said it was believed a better idea to build another pumping station for use only in hot weather when air condition demand is high.

Data on air conditioning assembled by the Kansas City Power & Light Co. discloses that Kansas City has 93 tons of refrigeration for each 1,000 population, compared to only 50 tons per 1,000 in most cities as Philadelphia and Chicago. A number of other cities already have had to limit the amount of water used for air conditioning.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices
TOWER BUILDING, WASHINGTON 5, D. C.

Executive Vice-president
WM. DALTON, WASHINGTON, D. C.

Secretary
JOS. H. COLQUITT, WASHINGTON, D. C.

President
J. P. JOHNSON, WASHINGTON, D. C.

Vice-president
A. B. EFROYMSON, CLEVELAND, OHIO

Treasurer
C. E. SIMMON, OKLAHOMA CITY, OKLA.

THIS MONTH IN BRIEF

New legislation covering the operation of refrigerated warehouses in the State of New Jersey has been passed by the State legislature. Under its provisions modern storage practices are recognized and obsolete practices have been eliminated.

The government cooler storage established during World War II in a limestone mine near Kansas City will be liquidated and closed, according to a Washington news report. This project has been a subject of much adverse discussion ever since it was established in 1943.

Representatives of the refrigerated warehousing and frozen foods industries held a joint session to make plans for the all industry frozen food conventions.

Results are published on a study of the storage of Bartlett pears made by the Refrigeration Research Foundation.

Cold storage holdings for July 31 shows public cooler space 64 percent and freezer space 76 percent occupied.

New Regulations for New Jersey Warehouses

Storage of foods and drinks in refrigerated warehouses and locker plants in New Jersey is modernized by adopting accepted methods and eliminating obsolete practices.

NEW legislation governing the operation of refrigerated warehouses in the state of New Jersey became effective July 19, 1951, date on which it was approved by Governor Alfred E. Driscoll, according to an announcement of the State Department of Health.

The new legislation is Chapter 342, Laws of 1951, which repeals Chapter 9 to Title 24 of the Revised Statutes. The new enactment regulates the storage of food or drink used by man or animals in refrigerated warehouses and locker plants, and provides for the issuance of licenses for the conduct of such establishments.

The recently approved legislation reflects the most recent scientific information and developments in the refrigerated warehouse business. It was found possible to eliminate several requirements which had become obsolete. This simplifies, without weakening, the regulation of refrigerated warehouses.

Hitherto, the license fee for a refrigerated warehouse was $10 per year, regardless of size. Chapter 342 sets up a graduated schedule of fees based on size. The minimum fee is $25. Under the new schedule, warehouse license fees will be more nearly in line with the costs of inspection. Under the previous legislation, licenses expired a year from date of issuance. Under the new legislation, all licenses expire June 30 and are immediately renewable.

Under the previous legislation, warehouse operators were required to submit to the State Department of Health a tabulation of articles in storage at the end of each month. The new statute simply requires that such reports shall be submitted upon request of the State Commissioner of Health.

Under the old legislation, items could not be stored for more than 12 months without special permission from the State Department of Health. The new maximum is 24 months. Extensions may be granted by the State Commissioner of Health.

The old legislation required placarding of stored articles as "Cold Storage Goods." That requirement has been omitted from the new legislation.

Under the former legislation, date of storage and date of withdrawal were required to be placed on each item. This requirement has been omitted from the legislation now in effect.

The new legislation strengthens regulation of refrigerated warehouses while at the same time abolishing certain unproductive and inconvenient requirements imposed upon operators by the old act.

Restaurant proprietors, farmers, and home owners who store products for use on their own premises are exempt from the provisions of the act.

Provisions of the new legislation were drafted for submission to the Legislature by a committee representing two warehouse trade groups, local health officers, and the State Department of Health.

The New Jersey State Association of Refrigerated Warehouses was represented on the committee by Horace W. Wilson and Robert E. Baker, both of Camden; John G. Hollmeyer, Leo J. Fisher, and Ralph C. Stokell, all of Jersey City; and Harold C. Emerson, Bridgeton.

The New Jersey Frozen Food Locker Association was represented

by Harold E. Rasmussen, president, of Boonton; Mulford L. Fisler, secretary, Glassboro; M. Hubert Hilder, Flemington; and Norman Gaskill, Elmer.

Local health officers who were invited to sit in on the conferences included Edward Gerner, Health Officer of Orange, and Dennis Sullivan, Health Officer of Jersey City.

State Health Department representatives on the committee included Alfred H. Fletcher, Director of the Division of Environmental Sanitation; Dr. L. M. Lounsbery, Chief of the Bureau of Food and Drugs; Milton Ruth, Principal Sanitarian of the Bureau of Food and Drugs; Dr. Oscar Sussman, Chief of the Bureau of Veterinary Public Health; and Ann Clark, Head Clerk, Division of Environmental Sanitation.

Text of Legislation

The text of the new legislation is as follows:

AN ACT concerning public health, regulating the storage of food and drink used by man or animals in refrigerated warehouses and locker plants, providing for the issuance of licenses for the conduct of such warehouses and plants, and repealing chapter nine of Title 24 of the Revised Statutes.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. As used in this act:

a. "Article" means any food or drink used for man or animals;

b. "Refrigerated warehouse" shall mean any place artificially or mechanically cooled to or below a temperature of forty-five degrees Fahrenheit in which articles, other than fresh unprocessed fruits and vegetables, are placed and held for thirty days or more, except a restaurant, store, home, or eating club utilizing its refrigerated warehouse space exclusively for its own use.

c. "Locker plant" shall mean any refrigerated storage warehouse or the portion thereof which provides separate individual lockers, cabinets, boxes, baskets, or other receptacles, for the storage of food products for home or personal use only and not for purpose of sale.

d. "State department," "department of health" and "department" mean the State Department of Health.

e. "Commissioner" means the State Commissioner of Health who is the chief administrative officer of the State Department of Health.

2. Any person desiring to operate or to continue to operate a refrigerated warehouse or locker plant shall make application in writing to the State department, upon forms supplied by the said State department stating the location of his plant or plants.

Upon such application accompanied by the proper fee, the department shall examine into the sanitary condition of the plant or plants, and if found to be in a sanitary condition and otherwise properly equipped for the business of a refrigerated warehouse or locker plant, the department shall issue a license authorizing the applicant to operate such refrigerated warehouse or locker plant, which license shall expire June thirtieth of each year.

3. The State department shall collect from each applicant for each license granted under the provisions of this act for each refrigerated warehouse or locker plant the following fees: for each refrigerated warehouse or locker plant with gross refrigerated space not in excess of one hundred thousand cubic feet, twenty-five dollars ($25.00); for each refrigerated warehouse or locker plant with gross refrigerated space in excess of one hundred thousand cubic feet but not in excess of one million cubic feet, seventy-five dollars ($75.00); for each refrigerated warehouse or locker plant with gross refrigerated space in excess of one million cubic feet, one hundred fifty dollars ($150.00). If a locker plant is operated as part of a refrigerated warehouse and upon the same premises, no additional license shall be required.

Any license issued pursuant to this section may be suspended, or revoked, upon hearing, for any violation of this act or of any rule or regulation of the State department.

4. Licensed refrigerated warehouses shall upon request submit reports to the commissioner setting forth the quantity of each and every food product stored in the refrigerated warehouse of the licensee.

5. The department shall notify any licensee when his refrigerated warehouse or locker plant or any part thereof shall be deemed to be in an insanitary condition, and if the licensee fails to put such warehouse or locker plant or the specified part thereof in a sanitary condition within the time designated by the department, it shall prohibit the use of such warehouse or locker plant or part thereof until such time as it may be put in a sanitary condition.

6. No person or corporation shall keep or permit to remain in any refrigerated warehouse or locker plant any article beyond the time when it is sound and wholesome and fit to remain in storage. If any article is found to be fit for immediate consumption, but unfit for further storage, such article shall at once be removed from storage and not again stored. No article shall be kept or permitted to remain in any refrigerated warehouse for a longer aggregate period than twenty-four calendar months, except by order of the commissioner. Upon evidence satisfactory to him that the article is sound and wholesome and fit for further storage, the commissioner may, in his discretion, grant an extension of the storage period.

7. In the event that any article is held in a refrigerated warehouse for a period of longer than twenty-four calendar months without extension having been applied for and granted by the commissioner, and neither the operator of the refrigerated warehouse nor the commissioner can locate the owner of the said article, after ten days' notice by registered mail directed to the last known address of such owner, by the officials of the refrigerated warehouse and a copy of the said notice to the commissioner, then and in that event, the commissioner shall have the power to order the disposition and sale of the said article for the purpose of payment of charges for storage or other valid liens against same. If a sale as herein provided is ordered by the commissioner, the proceeds of such sale shall be applied, first, to the payment of any and all charges for storage and service in connection with said property, and second, for any other valid liens against the said property. Any balance then remaining from the proceeds of the sales shall be paid to the owner of the said property, if such owner can be located; and, in the event the owner cannot be located within one year of the date of notification, then any balance shall be paid into the treasury of the State of New Jersey.

In carrying out any order of the commissioner for sale or disposition of any property under the provisions of this section, the owners or operators of the refrigerated warehouse are hereby relieved from any lia-

bility to the original owner or any other person or persons for the custody of said property, and from any legal liability under any warehouse receipt issued and outstanding covering the said property.

8. No article which has once been released from storage in a refrigerated warehouse and placed on the market for sale to consumers, shall again be placed in a refrigerated warehouse.

9. An article may be transferred from one refrigerated warehouse to another if all prior stamping, marking, and tagging remain thereon, and such transfer is not made for the purpose of evading any provision of this act.

10. No article shall be placed, received or kept in a refrigerated warehouse or locker plant unless the same is in an apparently pure and wholesome condition.

11. The refrigerated warehouse licensee shall assign to each lot of food and drink, when received for storage in a refrigerated warehouse, a distinguishing lot number for the purpose of identification, and shall keep an accurate record of such lot number, and shall also make and keep a record of the date of the receipt and of the date of removal of each lot of food and drink.

12. No person or corporation shall place, receive or keep in a refrigerated warehouse any article, unless plainly marked or tagged, either upon the container in which it is stored or upon the article itself, with the identification lot number assigned and recorded pursuant to the foregoing section; except that where products are bulk piled, palletized or piled in unit loads, it will be in order to have the outside of the bins in which the bulk is piled or the outside containers of the palletized or unit piled loads properly marked pursuant to the foregoing section.

13. No person shall alter, obliterate, mutilate, destroy, remove or eradicate any stamp, tag, or mark placed upon any package, container, or article to indicate that the article was received for refrigerated storage either from within or from out of State in order to evade any of the provisions of this act.

14. Any person who shall violate any provision of this act, or any rule or regulation of the State department made pursuant thereto, or who shall refuse to comply with any lawful order or direction of the department, shall be liable to the following penalties:

a. One hundred dollars ($100.00) for the first offense;

b. Two hundred dollars ($200.00) for the second offense; and

c. Five hundred dollars ($500.00) for the third and each subsequent offense, which shall be sued for and recovered in a civil action by, and in the name of, the State Department of Health or by and in the name of the local board of health, as the case may be, as plaintiff.

15. The local board of health shall enforce the provisions of this act within its jurisdiction.

The State Department of Health and the local board, and any officer or employee thereof shall, in the performance of any duty imposed by this act, at all times have full access to any refrigerated warehouse or locker plant for purposes of inspection and enforcement of the provisions of this act, and may examine and open any package or container which is believed to contain any article in violation of this act.

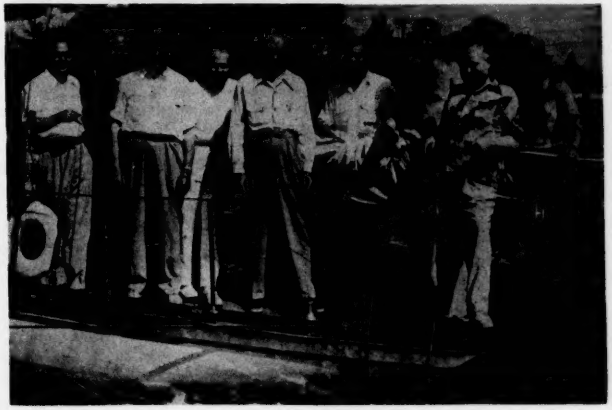
16. Any penalty recovered in an action brought under the provisions of this act shall be paid to the plaintiff therein. When the plaintiff is the State Department of Health, the penalty shall be paid by the department into the treasury of the State. When the plaintiff is a local board of health, the penalty shall be paid by the local board into the treasury of the municipality within which the local board has jurisdiction.

Refrigerated Warehousemen Play Big Role in Frozen Food Industry

OFFICIALS of the National Association of Refrigerated Warehousemen assume their share of the load in planning for the All Industry Frozen Food Conventions held each year in the spring.

This planning session is fast becoming a yearly event and was the occasion this year for the annual summer meet for the All Industry Frozen Foods committee. The meeting was held, as usual, on board the "Cynthia" — the 50 ft combination power and sailing vessel owned and operated by former packer president, A. J. Rogers of Cherry Growers Inc., Traverse City, Mich. It is reported that no accidents occurred and not a single member of the party got his foot caught in the anchor.

A real down-to-earth business session was held on board at which preliminary arrangements were made for the big frozen foods convention for 1952 which will be held at the Stevens Hotel, Chicago, March 2 to 7.



Landlubbers and sailors alike line up for their pictures just before the all-day cruise-meeting of Warehousemen and Packers. Left to right: H. K. Schauffler, New York, executive director, National Wholesale Frozen Food Distributors, Inc.; William Dalton, Washington, executive vice president, National Association of Refrigerated Warehouses; "Skipper" Rogers; L. S. Martin, Washington, secretary-manager, National Association of Frozen Food Packers; W. L. Pavlovski, Chicago, general convention chairman for 1952; Fred Deutsch, Menasha, Wis., Marathon Corp. (representing suppliers); T. E. McCaffray, Seattle, president, National Association of Frozen Food Packers; E. J. Watson, Mt. Vernon, Washington, immediate past president, National Association of Frozen Food Packers and last year's convention chairman; J. P. Johnson, National Association of Refrigerated Warehouses president; and W. M. Walsh, Pittsburgh, former president National Association of Frozen Food Distributors.

Storage Requirements of Bartlett Pears

A STUDY of the storage of Bartlett pears has been made by the Refrigeration Research Foundation, and the results published.

The harvest period of these pears usually lasts two to three weeks, beginning about mid-July in California (shipping and canning) and mid-August in the Pacific Northwest (primarily canning). For best storage quality, Bartletts should not be picked until the ground color begins to lighten and the lenticels have corked over. Earlier picking will result in a tendency to wilt, scald, and break down during storage, and pears picked too ripe will also tend to break down during storage. Use of hormone sprays to prevent dropping of fruit is regarded chiefly as protection against wind storms; hormone-sprayed fruit should be picked at recommended maturity if it is to store well.

Immediate and rapid cooling is considered to be one of the most important factors in successful storage of Bartlett pears. In fact it is considered to be less risky to leave pears on the tree a few days than to harvest them when it is impossible to cool them to 29 to 31 F. and store them at that temperature within 48 hours after harvest.

Pre-Cooled in Lugs

When Bartlett pears are received hot directly from harvest, they can be pre-cooled loose in lugs in forced air (protected from direct air blast from ducts) at 26 to 31 F. until the temperature reaches 45 to 50 F. Then to avoid freezing the minimum air temperature is raised to 29 F. Pears can be held in cold storage and subsequently washed and packed, provided ripening has not progressed more than slightly. If packaged and then cooled, the packagse must be widely spaced, off the floor and away from walls, and when cooled the stacks should still provide for adequate circulation. Investigations are being made on cooling by such means as pallet tunnels, with air movement at several hundred feet lin. per minute, and tunnels in which cold air is directed downward on open containers. These methods may prove feasible if they can be used economically.

The heat of respiration produced by Bartlett pears is about twice that of apples. They have a slightly lower freezing point than apples and are not subject to such low-temperature injuries as soft scald and brown core. Hence, they can be (and should be) stored at slightly lower temperatures than apples, and 29 to 31 F. is the recommended range.

Because pears are rather susceptible to shriveling, it is important to keep the relative humidity above 85 percent, preferably about 90 percent. Even higher humidity might be better, especially for slightly immature fruit, but then molds will require watching, on box surfaces or on fruit.

Effect of Temperature

It is well always to remember that pears are very responsive to temperature and that pear specialists regard them as the most responsive of the fruits. Thus, for long storage with best results the temperature should be maintained low. At temperatures above 35 F. and below 48 F. pears lose quality if held for an appreciable length of time, and canning quality as well as dessert quality is reduced.

The common forms of scald (brown or black discoloration of skin) is often due to harvest before adequate maturity, failure to refrigerate properly, or attempting to hold too long. Core breakdown often accompanies scald. It is a soft, brown breakdown in the core area, with disagreeable odor. It is due primarily to the same causes as common scald and the same measures must be used to prevent it.

Black or alternaria rot is decayed tissue, gray to black, dry in center, gelatinous at edge, easily removable as a core, that usually occurs late in the storage period. Conrtol of breaks in skins and prompt removal of affected pears from storage are the best control measures. Blue mold rot (scattered pinhole spots) and gray mold rot (firm dull-brown water-soaked decay with bleached borders becoming masses of dirty-white or gray "nests" of decayed fruit) are troubles that may occur especially with damaged or inadequately refrigerated pears.

Ripening is best accomplished at 60 to 70 F. Bartletts have much better eating quality when ripened at this temperature, and 65 F. is considered best. At storage temperature, pears do not ripen satisfactorily and at temperatures up to about 50 F. they do not keep well nor ripen well. Holding at room temperature (72 F.) or higher actually does not hasten ripening. For early Bartletts that are shipped to eastern markets it is possible to arrange for some ripening in transit by careful control of icing so that some ripening can take place.

Short Term and In-Transit Storage Service Provided

THE Department of Defense has announced inauguration of a commercial warehouse service program. The plan provides short-term and in-transit storage service to meet storage requirements of the military departments which cannot be met by their own installations.

Under the program the military departments will consolidate their overall requirements and contract through a single agency (Department of the Army) for public merchandise warehousing services.

As a part of the plan, 22 commercial warehouse field offices have been established throughout the country. Ten of these will handle the cold storage (perishable commodity) program and twelve will handle general merchandise. Those named as commercial warehouse field officers for perishable commodities are:

C. A. Martin, Hq QM Market Center System, 226 West Jackson Blvd., Chicago 6, Ill., serving North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Michigan, Illinois, Indiana, Ohio, Kentucky, Tennessee.

R. D. Barkhead, QM Market Center, 1321 Lady Street, Columbia, S. C., serving North Carolina, South Carolina, Georgia, Florida.

J. R. Carr, QM Market Center, Food Terminal Building, Denver 5, Colo., serving Wyoming, Utah, Colorado, New Mexico.

E. A. Whitt, QM Market Center, Fort Worth 1, Texas, serving Texas, Oklahoma.

L. Bloom, QM Market Center, 1206 Santee Street, Los Angeles, Calif., serving Southern part of California, Arizona.

S. M. Bellau, QM Market Center, Port of Embarkation, New Orleans 12, La., serving Louisiana, Arkansas, Mississippi, Alabama.

D. Hoffman, QM Market Center, 111 East 16th Street, New York 3, N. Y., serving Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania.

R. D. Gontzler, QM Market Center, North Boulevard and Kelly Road, Richmond 20, Va., serving Virginia, West Virginia, Delaware, District of Columbia, Maryland.

L. R. Thibodeau, QM Market Center, 180 New Montgomery Street, San Francisco 5, Calif., serving North California, Nevada.

A. H. Nelson, QM Market Center, PO Box 3225, Pier 91, Seattle 14, Wash., serving Washington, Idaho, Oregon, Montana.

July 31 Cold Storage Holdings

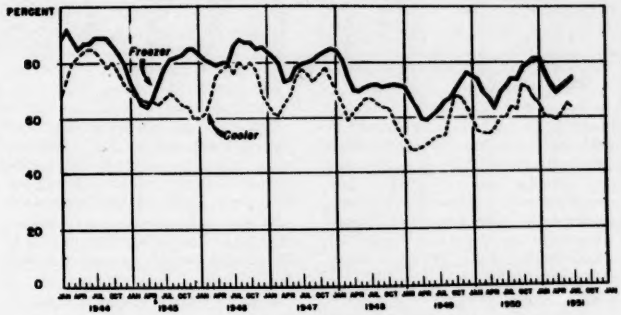
PUBLIC cooler space on July 31 was 64 percent occupied, 3 points below average occupancy but 4 points above the occupancy level of a year ago. During July utilization of cooler space decreased 1 point whereas the average change, during the 5-year period ended July 31, 1950, was a 1-point increase. In the East and West South Central regions there was a 3 and 1-point increase, respectively, in cooler occupancy during July of this year; no change was reported for the East and West North Central and the Pacific regions while decreases in cooler space utilization were reported in the remaining areas.

Freezer Occupancy

Freezer occupancy, which increased 3 points during July to 76 percent, was 5 points above last year's occupancy level and 2 points above average. There was no change during July in the amount of freezer space occupied in the East North Central and East South Central regions while the West North Central and South Atlantic regions each showed a 3-point decrease. Increased freezer utilization in the remaining regions ranged from 1 to 10 points. Only two cities — Norfolk and Nashville — had both cooler and freezer occupancy of 75 percent or better.

Cooler Occupancy

Cooler-held commodities amounted to 1.3 billion pounds on July 31 indicating a net withdrawal of 52 million pounds during July. This compares with a decrease of 21 million pounds during July of last year. All cooler commodities, with the exception of pears, dried and evaporated fruits, and cheese, showed net weight decreases. A net increase of 113 million pounds since June 30 raised the weight of freezer-held commodities to 2.1 billion pounds on July 31. A year ago freezer weights were increased 64 million pounds. Frozen eggs, poultry, beef, pork, and sausage were the only freezer items showing a net weight reduction.



Occupancy of Refrigerated Warehouses 1944-1951

National holdings of frozen fruits were up 25 percent since June 30 and by the end of July totaled 319 million pounds. This compares with 280 million in store this time last year and 320 million pounds in storage July 31 for the 5-year period ended 1950. All frozen fruit items except apples and grapes reflected seasonal gains during July. The largest increases were reported in stocks of cherries, 32 million pounds, and raspberries, 17 million pounds. Smaller gains of 1 to 6 million pounds were reported for other fruit items. Although the national total in storage was about average for July 31, frozen apples, grapes, and strawberries exceeded their respective 5-year average level, but the other fruit items were less than average for this time of year.

A net into-storage movement of 62 million pounds of frozen vegetables

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	July 31, 1951	June 30, 1951	July 31, 1950	Five-year Average
Meat and meat products, lbs.	699,056	778,413	542,713	553,812
Lard and rendered pork fat, lbs.	49,175	68,754	106,613	122,900
Frozen poultry, lbs.	106,848	112,369	103,367	123,857
Creamery butter, lbs.	105,243	72,598	230,063	120,550
American cheese, lbs.	224,292	204,009	256,395	171,869
Other cheese, lbs.	25,835	24,127	19,291	24,604
Shell eggs, cases	2,243	2,427	3,163	4,886
Frozen eggs, lbs.	189,270	189,980	174,761	220,440
Apples, bu.	305	680	115	.....
Frozen fruits, lbs.	519,065	256,863	280,400	319,907
Frozen vegetables, lbs.	351,832	290,321	283,334	252,207
Frozen fish, lbs.	142,329	127,351	137,307	125,889

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		July 31, 1951 (%)		June 30, 1951 (%)		July 31, 1950 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,287	5,996	46	64	47	71	46	64	59	73
Middle Atlantic	34,497	30,433	44	71	59	73	44	71	58	75
East North Central	27,198	24,406	79	69	77	77	79	69	77	73
West North Central	9,285	14,921	83	85	68	82	83	85	81	79
South Atlantic	8,104	6,223	65	73	68	80	65	73	70	77
East South Central	2,560	3,202	77	80	83	88	77	80	81	82
West South Central	6,953	7,279	61	58	66	62	61	58	73	68
Mountain	1,578	2,321	58	77	56	63	58	77	70	81
Pacific	15,783	21,703	41	67	53	65	41	67	51	71
United States	109,245	116,484	60	71	65	73	60	71	67	74

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent July 31, 1951		June 30, 1951		Net Piling Space (000 Cu. Ft.)		Space Occupied July 31, 1951		June 30, 1951	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	8	21	56	86	56	85	.....	.....	..	..	79	..
Middle Atlantic	1,307	1,678	44	86	50	83	1,408	258	87	91	86	90
East North Central	6,829	5,644	58	54	62	50	3,987	1,087	83	89	87	90
West North Central	693	2,489	86	71	78	60	13,730	6,266	88	88	91	88
South Atlantic	576	4,058	22	81	27	76	957	238	86	100	86	99
East South Central	.....	.....	..	..	..	..	274	74	91	91	94	92
West South Central	202	57	90	86	92	99	1,199	501	100	100	99	99
Mountain	104	47	97	47	99	51	767	437	86	98	91	98
Pacific	2,257	4,859	47	58	38	60	2,947	538	91	93	95	90
United States	11,976	18,853	55	66	55	63	25,269	9,399	88	90	91	90

NOTE:—Blank spaces indicate that insufficient returns were received.

brought the total on hand July 31 to 352 million pounds. Current holdings exceeded last year's stock by 68 million pounds and were 100 million pounds greater than average. Commodity-wise, only two frozen vegetable items accounted for the net increase during July. Frozen snap beans showed a gain of 8 million pounds; frozen peas, 81 million. The latter item more than doubled since June 30 and by the end of July amounted to 150 million pounds. Frozen orange juice stocks decreased during July to 20 million gallons, a drop of 2 million gallons since June 30. Other fruit juices and purees dropped approximately 3 million pounds during the comparable period.

Creamery butter stocks increased 22 million pounds during July and by the end of the month totaled 105 million pounds. The seasonal gain was about average for this time of year but was a third less than the increase last year, at which time butter in storage was twice the amount on hand this July 31.

Cheese Stocks Down

American Cheddar cheese stocks amounted to 224 million pounds by the end of last month. This compares with 256 million in storage last year and 172 million pounds on hand July 31 during the 5-year period ended 1950. Total cheese stocks were up 24 million pounds. American cheese accounted for 20 million of this increase, to 259 million pounds. Current supplies of cheese were about a third greater than average but were below supplies on hand last year.

Shell eggs reached their peak in storage stocks on June 30 when 2.4 million cases were on hand for the second smallest peak stocks on record. By July 31, case eggs in storage were reduced to 2.2 million cases and were again the second smallest amount in storage ever recorded for this time of year.

Little change was reported in frozen egg stocks during July. Total on hand July 31 amounted to 189 million pounds as compared with 190 million in store a month earlier. Compared with last year's stocks, current supplies were 8 percent greater but were 14 percent below average for this time of year.

Frozen poultry stocks showed a seasonal decrease of 5 percent since June 30.

Frozen Poultry

By the end of last month, total frozen poultry in storage amounted to 107 million pounds as compared with 112 million in store June 30. Although national stores of poultry exceeded last year's total, the amount on hand July 31 was 14 percent below average for this time of year. However, such poultry items as fryers and ducks exceeded their 5-year average levels by 4 and 2 million pounds, respectively, while fowls and turkeys were below average by 5 and 12 million pounds, respectively.

National holdings of all classes of meats amounted to 699 million pounds on July 31, reflecting a net withdrawal of 79 million pounds since June 30. July 31 stocks were approximately 156 million pounds above holdings of a year ago and above average for this time of year by 145 million pounds. Beef in storage totaled 85 million pounds on July 31 as compared with 61 million pounds last year. Pork, at about 500 million pounds, exceeded last July's stocks by 106 million pounds. Of the total pork in storage, frozen pork amounted to 291 million pounds; dry salt pork, 50 million pounds; other pork, 158 million pounds. All of these pork items in storage exceeded their respective 5-year average levels. Lard and rendered pork fat decreased to 49 million pounds or a drop of 20 million pounds since report at the end of last month.

July 31 stocks of fishery products increased 17 million pounds to a total of 177 million pounds. Of this amount, 142 million pounds were frozen fishery products as compared with 137 million in store last year and 127 million on hand June 30. Regionally, storages in New England held 48 million pounds of frozen fishery products followed by 36 million in Pacific and Alaska storages. The Middle Atlantic region held 20 million pounds.

Storage Outlook

Utilization of cooler space should increase during August despite a 1-point drop reported during July. This year, as in 1950, cooler utilization did not follow the 5-year average pattern but moved contrary to the indicated movement. With the onset of the apple and pear storage season, cooler utilization could rise 3 to 4 points above the July 31 level. Freezer utilization, now in the upward cycle, increased by greater than average amounts during July. The rate of increase may slacken during August, but should be 1 to 2 points greater than was reported a month earlier.

Canadian Holdings of Fruits and Vegetables

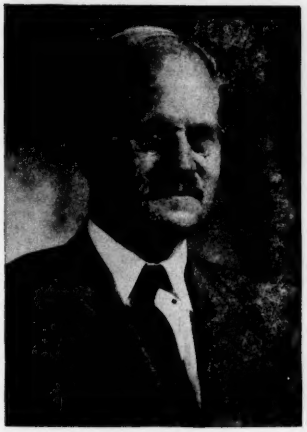
THE Dominion Bureau of Statistics of Canada, Agricultural Branch, report the following commodities held in cold storage on July 1, 1951.

Frozen fruit holdings in storages and factories July 1, 1951 amounted to 15,401,000 pounds as compared with 10,876,000 pounds June 1, 1951 and 9,461,000 pounds July 1, 1950.

Stocks of frozen vegetables in storages and factories on July 1, 1951 amounted to 5,498,000 pounds as compared with 6,570,000 pounds June 1, 1951 and 4,098,000 pounds July 1, 1950.

Prescott Honored by Food Technologists

THE 1951 Stephen M. Babcock Award of the Institute of Food Technologists has been granted to Dr. Samuel S. Prescott. The award, which includes a $1,000 cash prize contributed by the Nutrition Foundation, is made annually for distinctive contributions to food technology.



Dr. Samuel C. Prescott

Dr. Prescott's achievements cover the past fifty years, during which time he was on the faculty of the Massachusetts Institute of Technology. He has done much original work on the relations between spoilage of canned foods and the growth of microorganisms, and later work included notable contributions to milk sanitation, coffee chemistry and food dehydration. He has been chairman of the Board of Governors of the Refrigeration Research Foundation since it was formed in 1943 and for many years has been an active member of the Institute of Food Technologists.

Committees Appointed

WORK by the committees of the National Association of Refrigerated Warehouses is reported underway, with all appointments made and in some cases definite projects assigned. Chairmen are as follows:

Banking, H. J. Nissen, Los Angeles; Warehouse Operations, J. J. Gallery, Boston; Legislation, Jerry P. Johnson, Washington, D. C.; Transportation, M. W. Young, San Francisco; Insurance & Safety, A. G. Janney, Baltimore; Membership, P. G. Kuehn, Milwaukee; Public Information, G. A. Shoemaker, Elmira.

Missouri Valley Chapter Meets

IN THE shadow of Pikes Peak and amidst the vacation features of Colorado Springs' delightful Broadmoor Hotel, N.A.R.W.'s Missouri Valley Chapter sat down for two days of business in June, with a majority of members attending. In addition to some fine industry discussions presided over by Chairman Jim Wilkerson, the members heard from N.A.R.W. officials also in attendance and their Secretary, A. F. Versen. Newly elected officers of the Chapter are: Chairman, H. A. Steinmeyer, Booth Cold Storage Co., St. Louis; Vice-chairman, George M. Brown, Wichita Ice & Cold Storage Company, Wichita, Kans.; Treasurer, Walter H. Rathert, Chouteau Avenue Crystal Ice & Cold Storage Plant, St. Louis.

Jerry Johnson, president, A. B. Efroymson, vice-president, and Wm. Dalton, executive vice-president of the National Association were guests and participated in the program and discussions.

Group Insurance Audited

THE first annual audit of the National Association of Refrigerated Warehouses Group Insurance plan books and records was recently completed by the State Mutual Life Assurance Company which underwrites the plan. The report stated, "We find the administration of this case to be on a very sound basis, and wish to commend you for the fine job being done. The records examined were found to be neatly and accurately kept."

Although enrollment of new companies in the plan is currently halted by the wage freeze, several companies are waiting to enroll as soon as the Wage Stabilization Board makes its expected ruling exempting group insurance premiums from the wage freeze. All indications point to continued growth and expansion.

County Hospital Adds Cold Storage Plant

ALTHOUGH slowed by delays of materials, construction of a two-story and basement cold storage plant of the county hospital at Fond du Lac, Wis., is nearing completion. The structure, which will cost approximately $91,000, was authorized several months ago by the county board. It has accommodations for cold storage rooms varying from minus 10 F for quick freeze operations to 65 F for fruits and vegetables.

Refrigerated Warehousing

Atchison Limestone Mine Cooler to Be Closed

A NEWS report from Washington states that some time during August the government storage project in a limestone cave near Atchison, Kansas will be closed. The few dried eggs remaining in the cave at present are being "programmed," and the cave should be completely evacuated by the end of August. It will remain on a "standby basis" until such time as the Department of Agriculture officials decide "what to do with it." According to government officials there are no other commodities at the present time to store in the cave, and the final "end use" of the mammoth underground project is a matter of conjecture at this time.

Operated by Government

For nearly ten years this former limestone mine was a federally sponsored refrigerated warehouse for millions of pounds of government owned and surplus food stocks. Its capacity, reportedly 3,000 boxcars, its efficiency, and its engineering have been a matter of considerable discussion among purveyors and storers of perishables for all of these years.

Subsequent to the cleanup of approximately six million pounds of dried eggs recently sold to Great Britain, only a few commodities have been stored in the last few weeks, and most of those have been in storage for research purposes, it is reported. As to the future, government officials won't commit themselves regarding the possible use.

The cave's temperature control system and equipment is reported to be valued at well over one million dollars, and the operation of the cave, both past and present, is under the direction of D. V. Case.

Commenting on the final closing of the project, Wm. Dalton, executive vice-president of the National Association of Refrigerated Warehouses said: "This decision on the part of the Department of Agriculture we believe is a wise one. We appreciate the sound judgment of U. S. Department of Agriculture officials who are conscious of the fact that the competitive factor in the refrigerated warehousing industry will continue to make it possible for both their needs (government agencies) and the needs of private customers to be adequately taken care of with maximum service and at fair rates of storage and handling."

Cold Storage Division Canadian Warehousemen

SESSIONS of the Cold Storage Division of the Canadian Warehousemen's Association which held its 31st annual conference at the Seigniory Club, Montebelle, Quebec, Canada in June presented an interesting program.

Dennis Day, Toronto, outlined the results of the 40 hour week on the cold storage industry. One of the most stimulating talks was given by H. C. Diehl, director of The Refrigeration Research Foundation. Mr. Diehl explained the various projects undertaken by the research organization and how the utmost is obtained from the money received by this organization. Members after hearing his talk reported they are very impressed with the results obtained from the limited budget.

Harry Toole, Winnipeg, whose company, Crescent Storage, has in a sense pioneered eviscerated poultry in Canada, explained the operation of his plant as to how fast freeze is obtained with relationship to liquid eggs and eviscerated poultry. Herbert Farnsworth, Quincy Market Cold Storage, Boston, outlined the aspects of frozen foods.

J. Leo Cooke, spoke on "Refrigerated Warehouses—State Side." Dr. G. B. Miller, Department of Agriculture, discussed the transportation and storage section's marketing service of his department. C.W.A. Managing Director, J. A. Whitmore, outlined the action taken by the Association in connection with the new Federal government depreciation scale on cold storage machinery and equipment. Ideas covering the modernization of old cold storage plants were explained by T. Sables, Toronto.

At combined cold storage and merchandise sessions, William Cowan, Winnipeg, spoke to "To be Chosen." Harry Pascoe and Reg Pearce outlined "Storage Period and Billing," and D. G. Andreson, Saint John, spoke on "Labor Management Problems in the Warehousing Industry."

For New Employees

A MANUAL for new employees, appropriately titled "Howdy" has been issued by the California Consumers Corp., Los Angeles, Calif. Making liberal use of cartoons, it tells the new employee in question and answer form the who, what, when, where, and why of the company's policies.

New Freezing and Cold Storage Plant Planned

LOCATION of a commercial freezing and cold storage plant at Turlock, Calif., initial unit of which will cost $250,000, has been announced by Marshall Albee, owner of warehouses in Riverbank and Ripon. The eventual cost of the plant is expected to exceed one million dollars.

Applications presently are before Maurice Woodruff, regional director of the National Production Authority, for permission to use needed materials in construction. Applications also have been placed with the Turlock planning commission and the county planning commission for a single story reinforced concrete insulated building with an area of 15,200 square feet. It will include one freezing room with six cells, one cold storage room, one engine room, office space and a covered receiving platform.

"The building and layout is so designed as to facilitate additional construction of five times as much space," Mr. Albee said. "We hope to make these additions within the next two or three years so as to meet demands for storage which already exceed capacity of the first unit. We now have a contract with Armour's which contemplates processing 83,000,000 pounds of products this year."

New Plant for Precooling And Storing Fruit

A LARGE fruit precooling plant has been established at Parlier, Calif., in the San Joaquin Valley by the United Packing Co. It can also be used as a cold storage warehouse. The number of employees in the adjoining packing plant has been increased to more than 80 and the harvesting personnel in the orchards and vineyards to approximately 250. Refrigeration is provided by 200 hp of refrigeration machinery.

The present capacity of the plant is 75 carloads of grapes, but sufficent refrigeration equipment was installed to allow for eventual expansion to approximately 250 cars.

Besides precooling fruit preparatory to its being loaded into refrigerator cars for shipment east, one of the main uses of the plant will be to remove field heat from fruit before it is loaded aboard refrigerated trucks that are hauling an ever-increasing percentage of California fruits east. To facilitate this, a special truck dock has been constructed in addition to the usual railroad loading docks.

Frozen Fruits and Vegetables in Storage

FROZEN peach, raspberry and strawberry stocks in storage June 30 totaled 145 million pounds with strawberry stocks accounting for 86 percent of this amount. Collectively, three fourths of the frozen fruits were classified according to package size. Thirty six percent of the classified strawberry stocks were in packages of one pound or less in comparison to 32 percent the previous month.

Conversely the rates of retail to institutional sized containers for peaches and raspberries fell below that of May 31 with 14 percent of the peaches and 23 percent of the raspberries reported to be in the retail containers on June 30. On May 31, 17 percent of the peaches and 28 percent of the strawberries were in this type container.

Sixty-five percent of the 193 million pounds of selected frozen vegetables in storage June 30 were classified as to container size. This coverage was exceeded only once during the current series of reports which started July 31, 1947. On July 31, 1950, packaging data were received for 68 percent of the total selected vegetables in storage.

Of the classified stocks in store June 30, 63 percent were reported to be in retail containers, reflecting a five point decrease during June. For individual items, asparagus and sweet corn showed increases in the proportion of stocks in consumer packages of one and three points respectively. Peas and spinach decreased 10 and 8 points respectively from the May 31 ratio of retail to institutional sizes.

COLD STORAGE STOCKS OF FROZEN FRUITS AND VEGETABLES IN PACKAGES OF ONE POUND OR LESS IN STORAGE MAY 31 AND JUNE 30 (000 LBS.)

	June 30		May 31	
	lbs.	pct.	lbs.	pct.
Peaches	687	14	1,183	17
Raspberries	2,289	23	3,030	28
Strawberries	33,808	36	17,473	32
Asparagus	8,015	68	6,138	67
Beans, lima	10,619	61	12,689	63
Beans, snap	7,344	65	9,698	68
Corn, sweet	4,758	58	5,744	55
Peas, green	26,792	56	19,221	66
Spinach	21,097	74	17,248	82

Quebec Cold Storages

THE Quebec Maritime Fisheries Department owned and operated 47 cold storage establishments with a capacity of 14,405,000 pounds in 1950, the Provincial Bureau of Statistics reports. More than half are located in Gaspe Peninsula and the rest at Riviere du Loup, on the St. Lawrence north shore and the Magdalen Islands.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Ray Burnett, Los Angeles, Calif.
Chairman Membership Committee
National Association of Practical Refrigerating Engineers

NEWS

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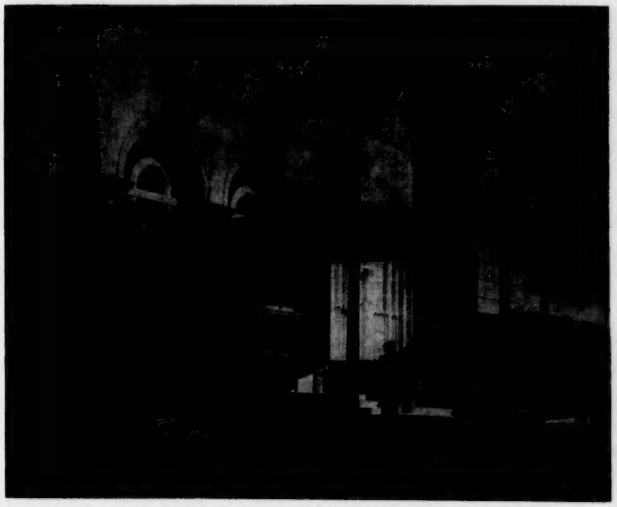
The demand for air conditioning in hotels continues to increase. Many existing buildings pose installation problems. Another important angle is the great loss in revenue that would result from taking the facilities out of service during an extended installation period. The Warwick Hotel in Philadelphia side-stepped many of these problems and Erich Utescher tells how the project was accomplished over a period of several years. With space at a premium the equipment was accommodated in the basement, on a set-back over the lobby and in a pent-house on the roof.

Air Conditioning a Hotel

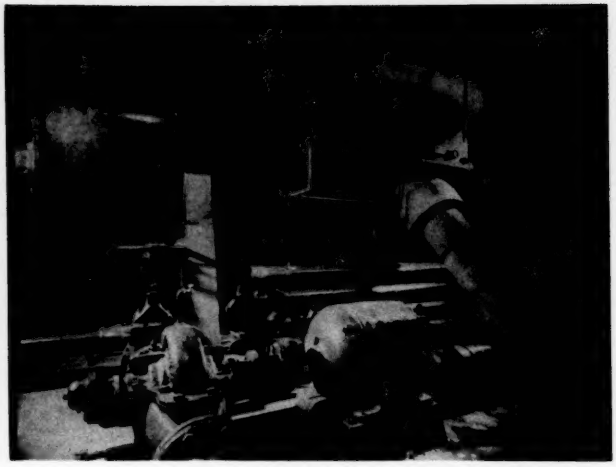
ERICH B. UTESCHER
Supervising Chief Engineer
Kirkeby Hotels, Philadelphia, Pa.

AIR conditioning of existing hotels is a problem that confronts the management and the engineering staff of many hotels. To the management falls the duty of deciding whether or not the investment can be made and whether or not it will be a paying proposition. The decision must also be made as to how many rooms may be put out of service at a time during the installation.

The engineering staff must obtain the best system possible for the money invested and to so plan the installation that the least possible revenue will be lost. As chief engineer of the Kirkeby Hotels, the latter duty falls to the writer of this article. The Warwick, in Philadelphia, was the first hotel in which we carried this out on a large scale.



Entrance to the Warwick, Philadelphia. This 900 room hotel had features typical of the well appointed building of some 20 years ago. It offered numerous problems to an air conditioning program.



Steam operated absorption refrigerating machine installed on the roof. It operates on purchased steam at off-peak rates and the condensate discharged from it preheats the domestic hot water supply for the hotel.

Early Application

In 1946 a system was installed which conditioned all of the public spaces. These included the lobby, offices and three restaurants on the first floor; the ballroom, foyer and seven private dining rooms on the second floor, as well as the barber shop in the basement.

The entire system was designed and installed by Carrier Corporation. Eight sets of apparatus were installed to condition the various rooms, with chilled water supplied by a 200 ton Carrier Centrifugal Machine. This was located in the basement, with the condensing water cooling tower on the roof above the twentieth floor. The centrifugal compressor was driven by a 200 horsepower electric motor through speed increasing gears.

With this system, we had great flexibility of operation. The lobby and offices, each of the restaurants and the ballroom had its own apparatus. The other three sets of apparatus conditioned the private dining rooms in appropriate groups. We could thus condition any or all space according to demand. The demand, however, was so great that all of the rooms were in use most of the time.

Bedrooms Added

Some of our guests come to Philadelphia for medical treatment, and many of them spoke of how much relief they experienced by sitting in the conditioned lobby. We felt that here was an opportunity to better serve our guests by providing air conditioned bedrooms. This project was started in the spring of 1949 and by mid-summer, we had 90 rooms conditioned.

For this installation, we chose the Carrier conduit system. With this system, we would have year round conditioning, lose very little space in the room, and except for occasional cleaning, require no servicing of the units in the rooms. Another major consideration was that we could abandon the old steam heating system in these rooms. The steam system was more than twenty years old and would have to be replaced before too long.

The rooms to be conditioned were a block of five rooms per floor on the eighteen bedroom floors. This block was in the center of the hotel and set back from the face of the building. Part of an existing penthouse on the lobby roof was used to house the apparatus, with the chilled water being supplied by the centrifugal machine. Extra capacity for refrigeration has been provided in the original installation.

We found that the demand for these rooms was so great that we started to plan for more rooms to be conditioned for 1950. This installation was larger than the two previous ones, as it included an additional 200 tons of refrigeration and the conditioning of 197 more rooms. The entire north wing was selected for this installation, as this wing had both transient and permanent guests in single rooms and suites. Again we chose the Carrier conduit system for the guest rooms.

The new refrigeration machine could not be accommodated in the basement without rearranging other departments. This left the room as the only available space to receive the equipment. A new pent house was constructed over the central part of the roof. We provided enough space to receive the refrigeration machine, and apparatus, and a like amount to use for storage at present, or to extend the air conditioning in the future.

This pent house is located over some of the guest rooms, and to insure against any noise and vibration being transmitted through the building structure, we selected the absorption refrigeration machine made by Carrier. This has no moving parts except a pump and contains no refrigerant, the water being its own refrigerant, with the water vapor being absorbed by a salt solution. The fan and the pumps were mounted on vibration absorbing bases.

In the air conditioning system, the outside air is dehumified in the apparatus and conducted to the rooms at high velocity in comparatively small diameter header and riser ducts. From the risers, the air goes through three inch diameter tubes to the room units. A secondary chilled water distribution system parallels the air conduits to the room units. By this means, individual control of the room temperature is obtained by the guests by merely turning a dial on the room unit.

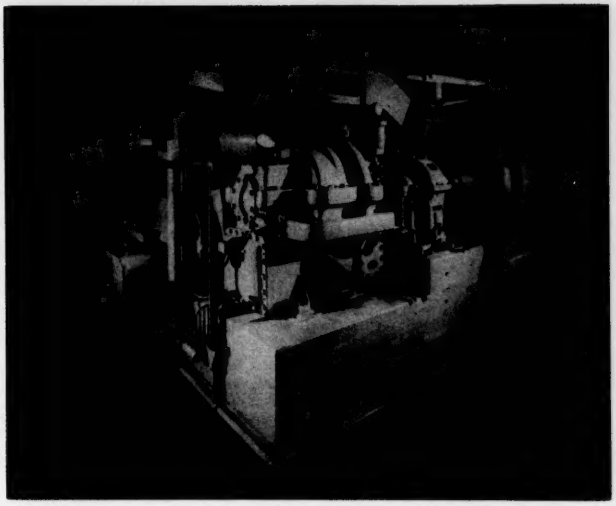
All exterior bath rooms were provided with hot water convectors for winter heating. Another feature, to provide the greatest possible flexibility, was an inter-connection between the two refrigeration machines. With this, it is possible to use either refrigeration machine on any air conditioning system or combination of systems.

Revenue Maintained

Loss of revenue was minimized by using a top floor room to assemble the risers. These were lowered through temporary chases installed in the rooms below. Thus only one room in eighteen was closed during a great portion of the installation. By coordinating our regular redecoration program with the air conditioning installation, we were able to reduce the revenue loss still more. All of the air conditioning installed at the Warwick was under the supervision of Joseph Blanchard, Carrier engineer, who planned ahead and made provisions for the future expansion of

the system. This forethought has eliminated the necessity of tearing out any of the installation as the system was expanded.

In conclusion, we have found that the installation of air conditioning in existing hotels is not a too difficult project. While many problems arise from time to time, as in any building project, they are met and settled as they arise. A new steam piping system for the heating of the rooms would produce nearly as many problems and at least as great a loss in revenue. As our restaurants and guest rooms have been filled to capacity during the cooling season, we feel that the entire project has been a worthwhile and paying proposition.



This 200 ton centrifugal machine with motor drive was accommodated in the hotel basement. The water it chills is interconnected with the installation on the roof so that flexibility is obtained.

N A P R E

Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Vacuum Check of Overhauled Compressor

Question No. 892: What vacuum reading can be expected on a vertical plate valve compressor after an annual overhaul, and how long should machine run before maximum figure can be reached assuming suction stop valve closed, and 150 lbs. head pressure?

As secretary, I have been asked to contact you on manufacturers' suggestions on probable gauge readings. What should be looked for if readings are not satisfactory?—D.H.B.

ANSWER: You have posed a question which I am unable to answer because I have not had any experience along this line with plate valves. I have often closed the stop valve in the suction line ahead of the main compressor suction valve and watched the suction gauge drop down as low as 28 inch vacuum in less time than one minute. However the valves in the compressor were not of the plate type. They were well ground balanced valves of the mushroom type, and the compressor had less than 1.5 percent clearance. On the other hand I have run a machine for over half an hour without lowering the suction below 12 inch vacuum. You might be interested in a formula which I have worked out that will give you the answer to the question as to what suction pressure should one obtain if the compressor operation were ideal. Here is the formula:

$$P_2 = P_1 \left(\frac{c}{1+c} \right)^{1.3}$$

P_2 is the lowest pressure obtainable in psia.
P_1 is the discharge pressure in psia.
c is the clearance, expressed in percent
1.3 is the gas constant for ammonia during isentropic expansion.

When c = 3 percent $c/(1+c)^{1.3} = .0101$
c = 2 percent $c/(1+c)^{1.3} = .00602$
c = 1.5 percent $c/(1+c)^{1.3} = .00417$

If P_1 = 150 psig or 164.7 psia

		In.Hg. Abs.	In.Hg. Vac.
P_2 with 3 percent clearance = 1.664 psia		3.38	26.54
P_2 with 2 percent clearance = .992 psia		2.02	27.9
P_2 with 1.5 percent clearance = .687 psia		1.40	28.5

K. N. Critchfield of the Worthington Pump and Machinery Corp. answered the question as follows:

"To begin with, we must assume that the ammonia compressor is in good mechanical condition, by that we mean that its rings are tight, both the discharge and suction valve are seating properly and that the main suction and discharge stop valves are in good condition so that they also seat tight.

Under the above conditions, a 26 inch vacuum should be obtained within 2 or 3 minutes. This, of course, would not be possible if there were any ammonia in the crank case, under which condition it might take anywhere from 35 to 40 minutes to eliminate this gas from the machine.

We might also caution you that the ordinary ammonia gauge is not very accurate and if you wish an accurate reading it will be necessary to use a mercury column. We have some instances where we had at 26 inch vacuum and by simply bumping the gauge another 2 inches, was obtained."—H. G. Venemann.

Centrifugal Ammonia Compressors

Question No. 894: Since centrifugal compressors have no parts to wear except the main bearings, and have the advantages of staging, why don't the ammonia compressor manufacturers build them in popular sizes from 2 to 25 tons?—M.J.B.

ANSWER: This question was answered in the June issue of ICE AND REFRIGERATION in my article "Large Centrifugal Refrigerating Compressor," and may be summarized with the statement that small ammonia compressors would be practically impossible to build for the following reason:

"Present standard design considers it impractical to apply a centrifugal compressor to an inlet gas volume of less than 1500 cfm and to a discharge gas volume of the final stage impeller of not less than 400 cfm due to the increasing friction losses and tendency to instability of the impellers when handling smaller volumes."

At standard ton conditions (5 F and 86 F) the smallest practicable ammonia compressor would have the following characteristics.

Capacity, 401 tons; total energy required for compression, 100 Btu per lb, or 77,800 ft lbs per lb; head per impeller, 9725 feet; number of impellers, 8; tip speed of impeller 770 ft per sec; area of final impeller exit, 2.34 sq in.; lbs ammonia per min., 169.

Note if only one pound of ammonia were circulated per min., the capacity would be reduced to 2.372 tons, and the final impeller exit area would be only .01385 sq in., but there would still have to be eight stages. The cross sectional areas of each impeller and of each diffuser between entrance and exit even though accurately designed in order to produce the velocities required would create so much turbulence and friction as to be very inefficient, to say nothing of the cost of manufacture. —H.G.V.

Ammonia in Calcium Brine

Question No. 893: A recent analysis of our calcium chloride brine for ammonia shows that it contains:

Free ammonia as ammonium hydroxide—3.26 grains per gallon.

Fixed ammonia as ammonium chloride—77.37 grains per gallon.

What is the procedure for removing this ammonia from the brine?—E.J.K.

ANSWER: The Ammonia could be removed by caustic treatment and boiling, but it is generally not worth the trouble and expense. In a small or moderate sized plant it might be cheaper to dump the brine and make up new. The important thing to do is to locate the source of the ammonia and prevent further contamination. If this is done, the brine can be treated to make it as good as new, without removing the ammonia.

Free ammonia is undesirable because it tends to soften and dissolve the zinc from galvanized cans. It should be neutralized as soon as possible with some acid substance. The easiest and safest method is to use chromic acid or sodium dichromate. To neutralize 3.26 grains per gal. of ammonium hydroxide would take 5 lb of chromic acid crystals or 15 lb of sodium dichromate, per 1,000 cu ft of brine. This will reduce the pH value of the brine below the danger point for galvanized cans, and at the same time will introduce some chromate to protect bare iron surfaces from rusting.

If a careful examination of the tank does not reveal any source of ammonia leakage, it may be assumed for the time being that the contamination was accidental. This should be checked by taking another sample for analysis a week or so after the brine is neutralized. If the analysis does not show any appreciable change in total ammonia content, then it may be considered that the condition is corrected, and the brine can be kept under control by an occasional test, and adjustment of pH value and chromate content. However, if the check sample shows a further increase in ammonia content, hold off any additional treatment until the leak is located. In an old style plant with coils in the tank, this may require taking the cans out of the tank, or even pumping out the brine, in order to expose the leak.

These remarks may be summarized by the following unit dosage: To neutralize free ammonia contamination, for every grain per gal. of free ammonia, as ammonium hydroxide, add 1.53 lb of chromic acid, or 4.6 lb of sodium dichromate to 1,000 cu ft of brine.—K. M. Holaday.

New Questions

High Pressure Causes

Question No. 895: When the condensing pressure goes up to unusual levels, how is it possible to determine whether the cause is fouled condensing surface, non-condensable gas or some other factor?—L.G.F.

Ice Cream Freezer

Question No. 896: Our ice cream freezers do not appear to operate at top efficiency when the condensing pressure is low. Is a certain minimum pressure drop required for ammonia liquid feed to ice cream freezers or could there be something wrong with our method of operation?—H.R.I.

Suction Trap Outlets

Question No. 897: We have problems with liquid refrigerant carried through surge drums or suction traps to our compressors. These traps are adequate size according to the usual authorities and the liquid should be separated from the gas but this does not occur as it should. The suction piping from the traps to the compressor header is probably not as large as it should be. I wonder whether the inlet velocity from the trap to the pipe may not be high enough to pick up some liquid despite the size of the trap and the low general gas velocity through it.

It occurs to me that the machine suction connection to such traps should have perhaps twice the cross-sectional area of the pipe run with a tapered reducer so that the exit velocity from the trap would be reduced considerably. What do you think of this idea? Have you any other suggestions for improvement of this liquid carryover problem?"—S.R.D.

Correcting Frost Heavage In Freezer Rooms

FLOOR construction for freezer rooms that are built directly on or below grade level must receive special engineering attention to prevent frost heavage says an article in a recent "Insulator," company publication of Armstrong Cork Co. This is particularly true of large rooms. Unless there is continuous supply of heat, whether it be provided by warm air, water, or possibly even oil, beneath the freezer floor, experience has shown that ice forming in the earth under the floor may eventually buckle the concrete slab.

Over a period of time the low temperature of the room will draw heat from the ground faster than nature can replace it, resulting in ground freezing under the floor of the room. The accumulation of ice and the force it generates will eventually buckle the freezer floor and cause a breakdown in operations. No amount of insulation can prevent the flow of heat from the ground into the freezer room. For insulation, no matter how effective, does not prevent the flow of heat, it serves only to retard its rate.

The article continues with information on preventive means and methods of dealing with frost heaving after it has occurred.

Fine Program Draws Engineers to Memphis Convention
Multiple Features Present Timely Subjects

AS THE fall season approaches the refrigerating engineers are looking toward the 42nd annual convention. Traditionally it brings them together to hear special lectures on the latest advancements in plants and production methods. The Memphis Convention, November 6-9, will carry forward the long established tradition.

Included in the program subjects are numerous papers specifically designed to provide better understanding of the fundamentals and basic factors in refrigeration. Along with them are discussions of current progress and development. Informal group presentations will be made on several subjects of timely interest by specialists of long experience in the particular field.

Short Course

In announcing the make-up of the Memphis program, Professor H. G. Venemann of the educational committee emphasized the useful character of the material to be presented at the convention. He said the papers when collected into a group and published will constitute a valuable short course on the various phases of the subject. Speakers have been chosen not alone for their knowledge and experience but also for their ability to present the subject matter in the form most useful to the membership.

The current interests of the membership were canvassed by the committee. Based on this the convention subjects were selected. Air Conditioning comes in for important attention primarily because it is the most rapidly expanding field in refrigeration. The public associates air conditioning primarily with comfort cooling but modern production especially under the impetus of the current military expansion is making greater and greater use of process air conditioning. All alert engineers want to be well informed on this subject. To fulfill this desire the Memphis Convention will present a discussion on "Estimating Air Conditioning Loads." This is both an art and a science in which experience proves very helpful.

Accompanying this discussion will be one on "Modern Compressors as Applied to Air Conditioning." While many compressors can be used interchangeably at different temperature levels the air conditioning applications have encouraged the production of a number of different types of compressors. Knowledge of all of them is important.

Combined Interest

The evaporative condenser development has undergone continual progress in recent years. It was the consensus that current information on the subject would be valuable to all members. A paper of this nature has been placed on the program.

The Designs and Ratings of Unit Coolers is a subject of exceedingly wide interest. Many engineers and especially those in the operating side frequently desire more information on cooler ratings because they want to be sure about the results to be obtained with them. It is apparent that this subject will have intense interest when presented at the Memphis Convention.

Much emphasis in new installations is placed on the ability to carry peak demands satisfactorily. That is one of the basic considerations in any job. At the same time due thought should be given to the manner in which reduced loads will be carried because few systems operate at peak on a continuous basis. The method of accommodating reduced loads in a satisfactory and economical manner will be covered in a paper at the convention.

Too many refrigerating plants are producing less than they should—frequently at a higher cost than necessary. Sometimes the actual wearing out and depreciation of the equipment is proceeding at an unduly high rate. An engineer with broad experience in the field will give detailed analysis of such situations and their remedies.

Combined Experience

Symposiums or round table discussions have proved to be one of the most excellent sources of engineering information when properly arranged with qualified experts handling the subjects. At least two of these symposiums will be presented at the Memphis meeting. They will be arranged to give the attendants just what they want of the subject matter. The symposium on Frozen Food Plants and Production will bring together a group of speakers with extensive experience in the field. Now that frozen food operations have expanded to all parts of the country this subject will have added interest for all the convention attendants.

Refrigerant recirculating systems are widely used and their number is increasing. At the same time certain problems have been faced in plants employing such systems. This subject lends itself quite well to the informal discussion type of treatment which it will receive on the convention program. Undoubtedly speakers on this subject will be presented with a number of questions from the floor of the convention by people now operating recirculating systems or those contemplating such installations.

More, Too

The foregoing list does not complete the educational program at the Memphis Convention. In addition there will be consideration of interesting features of late model refrigerating plants, and a basic study of power costs to determine methods of reducing this important factor in every refrigeration plant operation. All in all it adds up to a most worthwhile program.

Sufficient time will be allotted in connection with each paper and discussion to give those in attendance an opportunity to bring up phases on which they desire additional information. That is always one of the important features of NAPRE meetings. Headlining the presentations of this type material will be the Bureau of Refrigeration information in which experts in the different phases of refrigeration applications will answer specific questions propounded by the audience.

This session is always one of the most lively in the entire convention. It will have the same characteristics at Memphis because NAPRE members rarely show any hesitation about bringing up questions. On the other hand, the experts have always shown equal disposition to reply with a very good answer.

Convenient Location

The convention in Memphis this year will have a central location. Chapters and members in the middle west and south are looking forward to the convenience this location affords them. Some others are farther away but if they seriously evaluate the program to be offered they will already have plans made to attend the meeting.

NAPRE Department

In mid August Secretary Emerson Brandt visited Memphis to perfect the final arrangements with the local convention committees. He found that Memphis Chapter is planning well for the comfort and entertainment of the people who will attend this convention.

The entertainment and recreational features have been well balanced to give the people an opportunity to enjoy themselves while obtaining the real and permanent values which the educational program will afford them. The Peabody Hotel which is convention headquarters has excellent accommodations at reasonable rates. The chairman of the housing committee requested, however, that members send their reservations in quickly after the blanks are received in order that adequate provisions can be made for the accommodations desired by the convention attendants.

News Notes and Chapter Activities

Los Angeles

By Fred Herr

WHAT with Old Timers' Night and a community sing on the same evening's program, the rafters of the Terminal Club fairly rang with good cheer and conviviality on the night when Los Angeles Chapter closed out the first half of the season with a tribute to the founding members and those who carried the organization through its first years.

This annual Old Timers' Night usually brings out some members and former members who do not manage to get around to many of the regular meetings in the course of the year. So it was again this year, when old friendships were renewed among the 63 who answered roll call at the last meeting in June.

George Paulick, president, ran through a brief business session in double-quick time. Two new members were initiated: Charles F. Dean and Charles M. Peak.

Paulick then introduced Herbert Royden who served as master-of-ceremonies for the Old Timers' Night Program. Captain Royden introduced the old-timers in groups according to the year they had joined the NAPRE. Heartily welcomed and given a rousing round of applause was W. W. Stevens, who was the chapter's first president back in 1922. Mr. Stevens is now an executive with the Ontario Ice & Cold Storage Co. in Ontario, Calif. He acknowledge the introduction with a brief speech in which he reviewed the early days of the chapter in the early 1920's. Little did that small band of Southern California refrigeration engineers who founded California chapter No. 2 know that in less than three decades it would take rank as numerically the largest chapter in the National Association. They builded well, the Aldermans, Quinns, Roydens, Burnetts, Elliots, Murrays and Lamphiers and others who worked to make a go of the chapter during its first four years.

All who have been members 20 years or longer were introduced. Two were members of NAPRE chapters elsewhere before Los Angeles Chapter had come into being—William Losch, originally of Dallas, Tex., chapter; and Enos W. Alderman, both of whom joined in 1921.

Introduced next was Los Angeles Chapter's only charter member—E. W. Lamphier—who closed out a long career with the Terminal Refrigerating Company to enter retirement several years ago. His introduction drew a heavy round of applause.

Among those joining in 1925, who were introduced by Capt. Royden, were: E. T. Quinn, who rose to the national presidency; W. R. Burnett, Frank Elliot, H. R. Murray and Royden himself. Present from the 1928 initiates were Ed L. Nelson and Donald Byl. Rudi Kettler and R. R. Maple were introduced as 20-year men from the class of 1931.

Meanwhile, back in the audience sat a man who could trace his original NAPRE membership back to the early years of the association. He was Ben Duncan, marine engineer of the Baker Engineering Co. Mr. Duncan had been a member at various times down in Texas and Tennessee, but at the time he attended Los Angeles Chapter's meeting he was not affiliated with the NAPRE.

He is now. It was to be expected that a chapter with W. R. Burnett as chairman of membership, and whose members had won four national membership campaigns, would not let a man like Mr. Duncan escape without getting his name on the dotted line. Yes! He was signed up, and Ben Duncan is now once more a duly accredited member of the NAPRE.

A buffet lunch was made available in the adjoining restaurant section of the Terminal Club at the conclusion of the introduction of old time members. Ed L. Nelson, co-chairman of the evening provided the entertainment numbers. These included some good floor show acts and song and dance numbers. The most popular idea Ed had for the evening was an old-fashioned community sing in which, literally and truly, the welkin was made to ring.

The chapter is due to inaugurate its fall series of meetings with the annual ham and beans dinner in the Terminal Club, Los Angeles, on the night of September 5.

At this affair speech-making, rendering of reports and such other prosaic matters as reading of the minutes, etc., are strictly taboo. On this night the membership regales the inner man with succulent Virginia ham and oven baked beans, and dedicates the outer man to enjoyment of an entertainment program served up by Ed Nelson's entertainment committee.

The technical educational sessions are due to get underway on September 19. The season's opening talk that night will be a collaboration by Regis Gubser and Ed L. Nelson on "How to Reduce Operating Costs."

Three other educational programs have already been arranged for the period between September 1 and December 31st. On October 3 there will be an inspection trip through the plant of the Bender Machine Company. On October 17, Regis Gubser will give a talk and demonstration on the subject "Electrical Instruments, Their Maintenance and Use;" and on December 5, there will be held one of the always popular Quiz Programs, with Frank Elliott of the Union Ice Company as the Quizzmaster. The annual Jamboree is to be held on November 7 at the Uplifters Club.

The chapter followed its usual custom of holding no formal meetings during July and August. However, there were various occasions on which groups of members got together to participate in a mutually enjoyed sport. The chapter's first annual golf tournament was held at the Montebello Country Club on June 24. How Golf Committee Chairman Frank Eccleston proved that he was the proper choice for committee chairman by winning the tournament, and other details of the golf meet, were related in a report published in the August issue of Ice and Refrigeration.

Fishermen of the chapter were offered three opportunities during the summer to enjoy their favorite sport. Fishing trips were held on June 17, July 21 and August 18. Others are scheduled on September 15 and October 14.

Fourteen members participated in the June 17 expedition, which took off from Port Orange aboard the "Skipalong," with Captain Cy Tucker at the helm. First prize for the biggest fish landed went to Lyle Hoffman.

On July 21 the "Skipalong" had aboard another party of 14 NAPRE'rs as she headed out of Newport Bay at 4.48 a.m. and turned her nose toward the fishing banks out Catalina Island way. Aboard, as Captain Tucker shoved off, were the following:

Frank Hooper, Rudi Kettler, Joe Kettler, Robert Clegg, Elmer Harper, James Devault, Walter Chapline, Rollie Johnson, Herbert Royden, Jim DeLorie, Ray Smith, Joe Mai, and J. and P. Peralta.

Frank Hooper landed an 18 pound albacore early in the proceedings. For quite a while it looked like this was going to be the winner. Every time someone yanked one in over the rail and plopped it down on the deck, calculating eyes measured the fish's circumference and heads shook negatively as though to say, "Nope, that won't beat Hooper's fish." The scale ultimately proved them correct, except in one instance. Rudi Kettler hauled in an albacore which, when dropped on the scale, turned out to weigh exactly the same as Hooper's, 18 pounds. So Frank and Rudi were declared co-champs of the July 21 trip.

Hooper landed a second, though smaller albacore, Jim DeLorie pulled in three and Walter Chapline two. None of these, however, threatened the Hooper-Kettler duo.

The NAPRE fishermen are fortunate in having at their disposal so fine and efficient a skipper as Captain Tucker to head their expeditions. Captain Cy probably knows the fishing grounds off the California coast as well as any skipper alive. And he proved it by never failing to bring the NAPRE gang out to where the fish are, whether it be albacore, yellowtail, barracuda or tuna.

"Captain Cy would probably find some rainbow trout for us out there in the Pacific, if we asked him to," said Frank Hooper.

Colton

By H. O. Bonter

THE regular meeting was held at the Santa Fe Ice Plant in San Bernardino. It was opened with a discussion by F. J. Scherer and E. V. Berchtold on the experience with a brine cooler which froze up. The equipment is installed in an orange storage plant nearby. The difficulty was corrected by reversing the cycle to take hot gas back into the brine cooler. This thawed the brine coils which contained calcium chloride brine and the plant was put back in operation again with no damage to the coils. This was a very interesting discussion; the operator of this plant is not a member of NAPRE. It proves that an operator can learn a lot attending the meetings and having plant problems ironed out through benefit of the experience of others.

The second subject of the evening was presented by Gilbert Tuers and H. J. Foye of the Link-Belt Co. Their talks were illustrated by a motion picture on refrigerator car icing machines which showed the different types of equipment. The Santa Fe Railroad has 8 machines in operation and Pacific Fruit Express Co., has one at the present time. Following the pictures and the talk the group enjoyed the usual lunch and then went out on the icing deck to see one of the machines in operation.

Memphis

By Charles Conley

The August meeting was devoted to general chapter business. At the conclusion of routine matters there was a discussion of the future chapter programs. It was voted to resume the usual educational work starting with the first Wednesday of September. The new Refrigeration Course was discussed and there was some question about the program to be presented in addition to the course.

A lot of discussion was given to the coming national convention. The chapter will be host to the members in various sections of the country on November 6-9. Many years have elapsed since the last convention was held in Memphis. Numerous members of the chapter have joined since that time and have not attended a convention here. They are looking forward to this national meeting in Memphis.

Pittsburgh

By Otto Knoch

FOR some time an air of expectancy had been evident in Pittsburgh Chapter as it planned for the big Family Party on July 18. When the crowd gathered for the evening in the pleasant coolness of Duquesne Brewing Co. assembly room, it was evident that the expectations were fulfilled.

The party arranged through the courtesy of L. F. Koenig, president of the brewery was a great success. Some 110 members, wives and friends attended. The affair began with a most appetizing chicken dinner accompanied by generous servings of the brewery's excellent beer.

President James Gallina greeted the attendants and expressed appreciation for them to the Duquesne Brewery. Then he introduced Emerson Brandt, National Secretary, NAPRE. There is an added pleasure, Mr. Brandt said, in attending Pittsburgh Chapter meetings because he is usually given an opportunity to talk to the wives along with the chapter members. Most of his talks deal with engineering subjects he added, but in this case he would suggest that the wives secure their knowledge of refrigeration engineering from their husbands as in the past.

Instead, Mr. Brandt discussed the educational program of the NAPRE. He described typical NAPRE meetings and told the women what the engineers do and learn when they devote their evenings to meeting attendance. He reviewed the progress made by typical members of the association who took full advantage of the engineering instruction and the industry contacts made in the association and declared that the way up is always open to those men who will use their ability and some extra effort to get ahead.

The new Refrigeration Course which all members will begin to receive this fall, Mr. Brandt said, would add further opportunities to develop proficiency in the refrigeration field. He urged the wives to encourage their husbands to take full advantage of what this course offers to them. Then speaking to the members as a group he suggested ways in which the meetings could be arranged so that all would derive the maximum of knowledge and benefit from the course and the other services of the association. In conclusion he expressed appreciation to the chapter for the warm welcome accorded to him and to the Duquesne Brewing Co., for the excellent affair provided the chapter.

The attendants were divided into groups which were conducted on inspection trips to view the ultra modern equipment of the brewery at close range. Edward Tessmer, chief engineer of the brewery, gave additional information about the features of the plant and its operations. At the same time he saw to it that everyone enjoyed the brewery's product.

There were many compliments on the excellent service facilities for food and drink. The well appointed assembly room is attractively decorated and modern in every respect. The features include provision for large screen television presentation when these become available.

Rio Grande Valley

By Armin Doneis

THE chapter meets regularly every other Monday evening at the high school building in Weslaco. This city is in the middle of the Rio Grande Valley. Recently it appears that most of the attendants have come from the upper end of the valley.

At a recent meeting Jim Sudbury of Pharr gave our members a better picture of the problems and precautions necessary in dealing with the Freon refrigerants, and answered questions on the tricks of the trade and the headaches involved in the servicing of commercial and domestic refrigerating and air conditioning units. He discussed the use of dessicants and dehydrators, silica gel and alcohol.

At the meeting of July 23 we had a free-for-all letting down of hair and discussed troubles and puzzles that had stumped us at one time or another and how we extricated ourselves either by sheer force and awkwardness or through the sage advice of some greyer head at a chapter meeting. Mr. Casberg extolled the virtues of a mercury column pressure gauge on the suction line of his ice tanks and described its construction and principles of operation, recommending it as highly preferable so far as accuracy and dependability are concerned as compared with ordinary Bourbon tube gauges.

A number of our meetings are somewhat informal but those in attendance participated freely in the discussion of the questions presented. They enjoy the good fellowship and come away from the meetings feeling rewarded for the time spent.

Stockton-Modesto

By R. M. Edger

At our most recent meeting we visited the Santa Fe Ice Plant in Stockton. It has many features which proved to be interesting to the engineers.

Manager W. R. Greenstreet of the Santa Fe Plant conducted the tour and demonstrated the equipment. The new mechanical car icer is rather spectacular and created much interest. A Belmont liquid level control is in use in the plant. The connections and operation of this unit were of interest and this was also true of a Worthington V-W Compressor arranged for automatic operation. The members enjoyed their visit very much and I am sure they learned something of interest.

New Orleans

By Leo Vivien

AT THE July 16 meeting Instructor B. Mancuso continued his course on Operation and Maintenance of Refrigerating Plants. At a previous meeting Mr. Mancuso had elaborated on various methods of defrosting. It seems that some things go wrong however, so at this meeting he discussed ruptures in evaporator coils and liquid lines. His subject was in three parts. First, how to prevent trouble; second, how to be prepared for breaks; third, what to do or not do when the trouble occurs. The subject lecture centered on prevention rather than a cure for expected accidents. However, if and when trouble did occur, the best thing to do was explained for each class of accident.

Educational Chairman F. Chase arranged on July 25 for a very interesting lecture by the Carrier Corporation. The lecture was quite lengthy, but of such nature and general interest that it commanded the attention of the members.

The discussions were led by U. D. Bynum and Cliff Terrell, Engineers from the Dallas Office, John Gray and W. I. Thompson, Engineers from the Dallas Office, and Joe Crump, U. H. Johnson and L. F. Coker from the Houston, Office and E. S. Gray of New Orleans Office, were also present to assist where needed. When these people present a lecture they do a nice job. The subjects discussed were:

1—The Absorption Machine.
2—Conduit Weathermaster System.
3—Centrifugal Refrigeration.
4—Deferred Maintenance.

With the aid of slides, cuts and pictures, the lecturers explained the application and operation of these systems. The slides were arranged to show the location of troubles and points to watch during operation. The dismantling and reassembling of the centrifugal compressors, evaporators and condensers were shown step by step. The subject matter presented could have been spread into a full day lecture.

On August 1, the members of the Quarter Club, a fun loving bunch of members of New Orleans Chapter, entertained themselves with a chicken dinner and all the trimmings.

Operating Data Book Published

THE Eleventh Edition of the Operating Data Book was published in August and distributed to the membership of NAPRE. This 1951 edition follows the general format of previous issues with completely different material on a variety of refrigeration engineering subjects.

Numerous articles go to the heart of plant and operating problems and analyze the particular subject in simple but positive terms. Many members, for instance, have been looking forward to having the electrical maintenance and operating guide prepared by Regis Gubser available for reference. It is a part of the 1951 Operating Data Book under the title, Do's and Don'ts of Electrical Maintenance Around Refrigerating Plants.

The extensive section by Ed Nelson on Freezer Room Construction Problems contains complete material on frost heaving of freezer floors. The subject is analyzed on the basis of causes and occurence and gives specific details of corrective methods and their results. It is believed to be the first complete treatment of this timely subject published to date. Prior to publication it was already marked for attention by many refrigeration engineers throughout the country.

Authoritative data on fruit storage practice is presented by A. L. Ryall. In summary form, it gives detailed data on current good practice in the storage of these commodities. It provides good material for ready reference and use.

Other sections include information on erection and testing of equipment, mechanical refrigerator cars, and many other plant and production subjects.

Especially timely is the section on safety and accident prevention. Current data shows that the curve of accident frequency is rising. More specific activity will be required to change the trend and return to the former path of progress in safety work.

The annual Question Box will again be one of the much used features of the 1951 book. It covers a broad field in the usual plant problems in operation and maintenance.

Of equal interest is the advertising section. It contains data on the products and services of a large number of representative companies in the refrigeration field. In this way it constitutes a good source reference for practically all goods and services needed by the refrigeration plant.

A copy of the Operating Data Book is furnished free of charge to all association members. For chapter members, the book is distributed through the chapter. The national office distributes the books to members-at-large.

The Operating Data Book is much used in chapter educational programs. Reference to the subject index usually turns up a question and answer that aids greatly in handling the problems which members place in the question box. The special articles are also widely utilized in chapter work as well as individually by the members.

Round Up Time

THE 1951 Membership Contest will hit its peak during September as the closing date in mid October approaches. A number of chapters have been doing consistent work throughout the year while others count mainly on the enthusiasm and results of an intensive drive toward the end of the season.

Among the larger chapters Los Angeles gives the most vocal evidence of confidence that they will repeat their previous win. Their individual rivals in New Orleans have less to say and confine their remarks to the statement that they are working hard to come out on top. A recent summary of numerical reports to date showed Los Angeles in the lead, followed rather closely by another chapter which has not said anything for publication but is working rather effectively toward the prize position. Then New Orleans occupies the next position.

Among the smaller chapters the leaders were on a rather even basis when the recent summary was made. Of course there were 8 weeks remaining in the contest and a great deal could happen in that time. This year it probably will because individual contests are sparking the drives of many groups and the desire to win is high.

All chapters are being aided in their drives by the fact that they plan to begin special classes this fall based on the Refrigeration Course. It will be distributed to all members in serial form beginning in September. The National office has supplied descriptive folders on the course which they are utilizing. There is an added urge to bring new members in early so they can enter the course at the beginning.

Members at Large

Numerous refrigerating engineers have heard about the new NAPRE course in locations where there are no chapters at present. They have expressed interest and indicated a desire to take advantage of the good material it offers for their use. The number of men joining as members at large has thus been enlarged. Many of them inquire about the basis for establishing chapters because they wish to set up a regular program of instruction in their area and supplement it with the other phases of educational activity carried on in NAPRE chapters.

ENGINE ROOM POINTERS

Another Leveling Trick—With Hose Full of Water

IT IS safe to say that nearly every reader, at one time or another, has done a leveling job with a hose full of water, as in Fig. 1. It is an excellent method. This writer has used it many times and has frequently advocated its use.

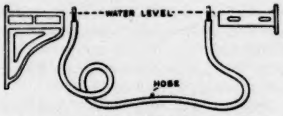


FIG. 1

But there are a couple of important little details that should be watched carefully. Although the method is simple it is not unfailing in accuracy at all times. Thus on the writer's recommendation a leveler of this type was used in a large plant for leveling shafting. The user was amazed to find that the apparatus was inaccurate and for a long while he couldn't understand why. Presently it was learned that the error was due to the fact that one end of the hose was subjected to a higher temperature than the other end, and as a result the column of water in the warmer end registered a higher level than did the column in the cooler end of the hose. Give the matter a bit of thought and you will understand why, namely: warm water is lighter per cubic inch than cold water, hence a higher column of warm water is required to balance a cold column of equal weight.

In order to show how these weights differ, the writer prepared the accompanying sketch, Fig. 2. As indicated in the sketch, a column of water whose temperature is 70 F. will create a pressure of one pound per sq. in. if the column is 27.9 inches in height. Similarly, if the temperature of the water in the other end of the hose is 200 F. that column will have to be 28.8 inches high to create the same pressure. As shown, there will be a difference in level of 28.8 minus 27.9, or, nine-tenths of an inch. This the writer shows as an "error." Obviously, such a difference in temperature would make any leveling job decidedly inaccurate and might cause many a user to say that this method is "no good."

It must be admitted that the writer has used an extreme case here as it is not likely that a leveler would ever have a temperature at one end of the hose as high as 200 deg. F. However, since the error is approximately proportional to the difference in temperature the error would be about one-half as much with a temperature difference of 65 degrees. In the above instance the difference is 200 minus 70, or, 130 degrees. One-half of 130 degrees is 65 degrees.

So, in view of the above, it is obvious that if there is an unavoidable temperature difference, as there sometimes is, the thing to do is: make the "head" as small as possible. It is clear that, the less the head, the less the error. This is a kink that is worth remembering and putting into practice when you use a hose for leveling.

Another thing to be careful about is entrapped air. If the hose is coiled when it is being filled with water, air may be accidentally trapped in it. Unless all air is out of the hose it is quite possible that there will be a considerable difference in level due to that cause. Why? Because a column of air and water does not weigh as much as a column of pure water —W.F.S.

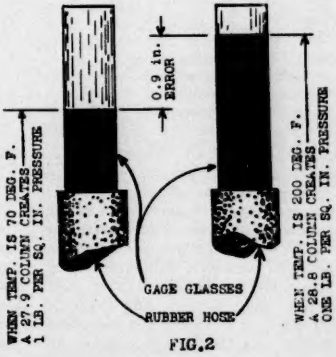
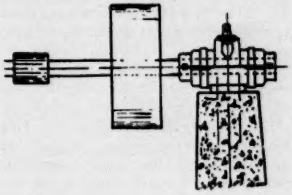


FIG. 2

Pulley and Shaft Kinks Save Time and Money

WITHOUT giving much thought to the question, many users of pulleys and shafts install pulleys incorrectly in the manner as shown in the accompanying sketch. This sketch may "look all right" to the average user, but it isn't all right.

What is wrong with it? The pulley is too far away from the bearing. As will be observed, the pulley could be moved over on the shaft toward the right a considerable distance where it would receive more rigid support from the bearing.



When a pulley is not located near a supporting bearing it is obvious that, when the belt is placed on the pulley and when the drive is fully loaded the shaft will be deflected more or less, the amount of deflection depending on the tension in the belt and the strength of the shaft. It is also obvious that a stronger and more costly shaft will be necessary to hold the pulley in alignment when in the position shown in the sketch than would be necessary if the pulley were closer to the bearing.

Pulley position like this, and shaft weakness, are commonly the cause of sufficient misalignment of the pulley to cause the belt to pump off the pulley continually — and the operator wonders why. He stops the machinery, checks the alignment, and finds everything to be OK. Yes, the pulley IS in alignment when the belt is off and not pulling, but it can be badly out of alignment when under full load.

Another kink: By using a ball bearing instead of a plain bearing you can place the pulley still closer to the center of the bearing and thus use a shaft that is even smaller and therefore less costly. The distance from the "center of the bearing" to the "center of the pulley" is the distance that counts.—S.W.F.

Electric Motors Require Care and Upkeep

DOES poor care reduce the efficiency of electric motors or generators is a question that is commonly asked by many users of electric motors and generators, and it is an important question. Yet, so far as the writer knows it has never been directly answered in print. The writer will therefore try his hand at answering the question.

As a rule, if a motor or generator is not properly cared for, such lack of care is more likely to cause damage to the machines, necessitating expense for repairs, rather than cause material change or reduction in efficiency.

One of the most probable dangers resulting from lack of attention is trouble with the bearings, although with the present method of lubrication which is generally used in these electrical machines, it is only necessary to be sure that the proper amount of good lubricant is in the bearing oil receptacles.

In the case of direct current machines, the computator and brushes should be kept in good condition, otherwise sparking will result and through sparking serious heating and burning may take place, resulting finally in a harmed condition of the rotating part.

Sparking is usually the "warning signal" to the attendant to correct whatever may be at fault. Hence the operator should have but little difficulty in knowing when things are begining to go wrong and he should take steps immediately to rectify the wrong.

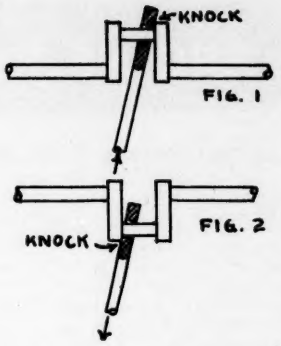
If bearings, become worn so badly that the rotating part is no longer concentric with the bore of the stationary part, as sometimes happens, unbalanced magnetic conditions are the result. This causes considerable increase in the pressure which the bearing must carry, and also unequal current distribution in the armature conductors. An electrical machine in this condition will heat more than would be the case under normal conditions, and there would of course be the future danger of the insulation becoming damaged through overheating.

Therefore as a result of the increased heating which is produced in the cases here mentioned, the efficiency of the motor or generator is thereby decreased somewhat, to be sure, but as stated in the second paragraph above, the decrease in efficiency is a minor matter as compared with the material damage which may result from the poor care given the machine.—F.S.W.

Imperfect Alignment of Crank Causes Knocking

INASMUCH as the above question is commonly asked, and it is difficult to answer without a sketch, the writer is showing herewith, in an exaggerated way, why there is bound to be a knock in a crank, eccentric, etc., where the center of travel of the piston or crosshead does not exactly bisect the center of the crank or eccentric bearing. This is true also even though the line of travel of the piston or crosshead is at exact right angles with the crankshaft, and all other conditions are perfect excepting alignment.

In Fig. 1 is shown a connecting rod pushing the crank "out." Where alignment is not correct, it is obvious that the end of the connecting rod will be forced over toward the right, as shown. And when the crank arm is struck there will be a knock. The loudness of the knock will depend upon the looseness of the fit as well as the extent of imperfection of alignment. In Fig. 2 is shown the same connecting rod pulling the crank "in."



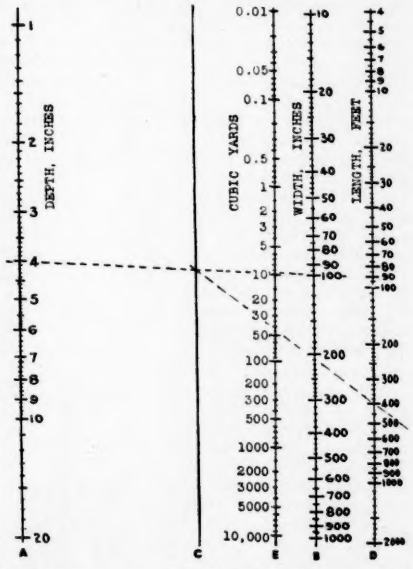
At the beginning of the next stroke the end of the connecting rod will strike the other crank arm with another bang. And there you are. There are two knocks per revolution.

It is obvious, too, that this sort of misalignment makes for friction as well as noise. Good alignment and good fitting eliminate knocking, and with proper lubrication friction is reduced to the absolute minimum.

Chart Shows Cubic Yards of Concrete

THIS simple chart makes it easy to find the number of cubic yards of concrete required for any depth of walk, road, or what not. It does away with pencil figuring entirely.

For example, if you want to build a walk 4 inches deep, 100 inches wide, and 400 ft. long, the dotted lines drawn across the chart show how it is done. Connect the 4-inch depth, column A, with the 100-inch width, column B, and locate the intersection with column C. Then from that point of intersection run through the 400 ft. length, column D. The answer is immediately given in column E as about 41 cubic yards.



But that isn't all. The chart is applicable to ANY dimensions. Thus for example if the depth is 40 inches instead of 4 inches, merely add one cipher to the answer in column E and you will have 410 cubic yards. The same dotted lines can be used to find that answer. And again, if the depth is 40 inches and the width 1000 inches, the answer becomes 4,100 cubic yards by adding two ciphers. In other words, if it is necessary to add ciphers in column A, B, and D, the total of those added ciphers must be added to the answer in column E. However, the chart is broad enough to cover most concrete jobs without adding any ciphers.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE INDUSTRIES

Executive Offices
1706 L St. N. W., Washington 6, D. C.

Executive Secretary
Guy W. Jacobs, Washington, D. C.

President
H. O. McLain, Chicago, Ill.

First Vice-president
E. F. Condon, Los Angeles, Calif.

Second Vice-president
Wm. J. Ayers, Memphis, Tenn.

Treasurer
Geo. Steers, Jr., Kalamazoo, Mich.

THIS MONTH IN BRIEF

New price regulations have been issued for the ice industry to be under the jurisdiction of the OPS regional and district offices. A bulletin has been issued by the National Association of Ice Industries providing interpretations of the new regulation.

Winter and spring advertising of the National Ice Public Relations is beginning to show results at peak of ice season in magazine and newspaper advertising and publicity. An interesting behind-the-scene report gives details of preparing three-page color publicity spread in Life Magazine.

A new supermarket opened the middle of July in Michigan City, Ind. by the Kroger Company has been equipped with a set of new type super market vegetable display cases, representing the last word in modern vegetable display with crushed ice.

The importance of the supervisor, his duties and responsibilities, is discussed by an experienced ice company manager.

Ice Regulations Issued — Now Under OPS Field Offices

THE administration of price control for the ice industry has been placed in the hands of the OPS Field Offices by Supplementary Regulation 45, issued by The Office of Price Stabilization effective August 1, 1951. This order reads in part:

The Order

This regulation establishes procedures and standards under which adjustments may be made in the ceiling prices of sellers of natural and manufactured ice.

Ice is an essential commodity to many millions of families and to thousands of institutional and industrial establishments. Yet, there are many communities in which there is a distinct possibility of a shortage of ice due to the threatened closing of ice plants. Many such plants are faced with serious financial hardship and do not have sufficient capital to weather anything but very short periods of financial loss. This hardship is due to a combination of circumstances extending over a period of time. Volume decline of the industry since 1946 due to competitive factors and weather conditions has resulted in higher unit costs. Generally speaking, the operating margins of the industry have been relatively low for several years and, as a consequence, many companies have little or no margin available for absorbing cost increases.

Ice prices were originally placed under control upon the issuance of the General Ceiling Price Regulation. Ice manufacturers and harvesters were later included under the Manufacturers' General Ceiling Price Regulation (CPR 22). The former regulation fails to recognize seasonal price patterns. A substantial number of ice sellers customarily have low winter prices and higher summer prices and the freeze period, therefore, was one of low prices which, under the best circumstances, are probably inadequate for round-the-year operations. The cost increases recognized by the Manufacturers' General Ceiling Price Regulation represent only a relatively small proportion of total cost in ice manufacturing and distribution. Moreover, prices for sales to ultimate consumers are not covered by the latter regulation, so that the over-all relief, to compensate for higher costs incurred since pre-Korea is negligible.

While it is the policy of the Office of Price Stabilization to issue as quickly as possible regulations tailored to the characteristics of specific industries, issuance of such a regulation for the ice industry is not now feasible. The manufacture of ice is typically carried on by small, local companies because the distribution of ice is limited by the bulk and perishability of the product. Prices vary drastically from one market to another, the price range for sales to domestic users in the larger cities running from 60 cents to $1.30 per cwt. This variation is due, in large part, to cost factors which are related to the volume of business and density of population. Because of the localized character of this industry, an over-all regulation prescribing uniform prices for the country, or even for regions, would not be appropriate and a tailored regulation would have to allow for individual price adjustment for local areas. However, the burden of collecting the necessary data to support such a regulation is great and the time of high consumption is at hand.

Local Adjustments

In view of the urgency of the situation in terms of the necessity for maintaining supplies of an essention commodity, the Director has concluded that the most effective means of dealing with the problem is to authorize local adjustments in ceiling prices. Adjustments in prices will be made in those cases in which it is shown that a manufacturer or harvester is currently suffering a net loss or earning such low net profits that, if his operations should continue on that basis for a substantial period, he would not be able to continue to meet local demands for ice. In determining the amounts of adjust-

ments, consideration will be given to prevailing prices and to the amounts by which ice prices were increased generally between the Korean outbreak and the issuance of the General Ceiling Price Regulation. Provision will be made, in addition, for adjustment in appropriate cases of the ceiling prices of those who purchase ice from such manufacturers or harvesters for resale.

It is planned to delegate to Regional Directors of the Office of Price Stabilization authority to make the adjustments provided for by this regulation, and Regional Directors will in turn be authorized to redelegate their authority to District Directors. Applications for adjustments will in most cases, however, be required to be filed with District offices.

By a separate action effective on the same day as this regulation the manufacture of ice will be removed from the coverage of CPR 22.

Findings of the Director. In the judgment of the Director of Price Stabilization the ceiling prices established by this supplementary regulation are generally fair and equitable and are necessary to effectuate the purposes of Title IV of the Defense Production Act of 1950.

So far as practicable the Director of Price Stabilization gave due consideration to the national effort to achieve maximum production in the furtherance of the objectives of the Defense Production Act of 1950; to parity prices and the other minimum requirements of the law including prices prevailing during the period from May 24, 1950 to June 24, 1950, inclusive; and to relevant factors of general applicability.

To the extent practicable, persons representing important segments of the industry have been consulted in the preparation of this regulation and their recommendations have been fully considered.

Regulatory Provisions

SECTION 1. *What this regulation does.* This regulation establishes a procedure for and standards under which ice manufacturers' and harvesters' ceiling prices and the ceiling prices of those who purchase ice from them for resale may be adjusted.

SEC. 2. *Who may apply for an adjustment.* You may apply for an adjustment under this regulation if you are a manufacturer or harvester of ice. In making your application you may also request that provision be made for adjustment of the ceiling prices of those who purchase ice from you for resale.

SEC. 3. *How to apply for an adjustment.* Despite the provisions of Article III of Price Procedural Regulation 1, you must, in order to apply for an adjustment under this regulation, write to the Director of the District Office of Price Stabilization for the District in which the plant for which you are seeking a price adjustment is located. If, however, the ice business of the plant involved cuts across more than one District, you will have to write to the appropriate Regional Director. Moreover, in any case in which that business cuts across more than one Region, you will have to write to the Director of Price Stabilization, Washington 25, D. C. You may apply on a form obtainable from any District Office. Whether or not you use the form, you must, in addition to requesting an adjustment, give the following information:

Information Requested

(a) The prices at which you were selling ice on June 24, 1950:

(b) Your ceiling prices under the General Ceiling Price Regulation;

(c) A profit and loss statement in relation to your ice business for your most recent fiscal year, but (1) if you have no profit and loss statement, then a statement of your expenditures and income in relation to such business as reported and reflected in your most recent federal income tax return, or (2) if you have no separate accounts for ice, a statement of expenditures and income for your overall operations and an estimate of the expenditures and income attributable to your ice business;

(d) The dates and amounts of any price changes you have made since the beginning of your most recent fiscal year;

(e) The dates and amounts of any wage or salary increases you have granted since the beginning of your most recent fiscal year;

(f) The tonnage of ice you sold during your most recent fiscal year, and an estimate of your sales to each class of purchaser; and

(g) A statement of your customary seasonal price changes during your most recent fiscal year.

SEC. 4. *When an adjustment will be granted.* (a) An adjustment in your ceiling prices will be granted whenever the Director or his authorized representative finds, on the basis of the information you have supplied and such other information as may become available to him, that:

(1) You are currently suffering a loss on your net sales of ice or that the level of your earnings on such sales is such that if you should have to continue for a substantial period to sell ice at the prices established by the General Ceiling Price Regulation, a threat will arise that you will not be able to continue to supply ice in the area involved;

(2) That the financial position in which you find yourself is not substantially attributable to temporary, non-recurring factors or to some factor other than your ceiling prices, and

(3) That the granting of the adjustment will not be inconsistent with the purpose of the Defense Production Act of 1950.

(b) If it is found that your ceiling prices should be adjusted, the amount of adjustment will be such as the Director or his authorized representative determines to be necessary in order to enable you to continue to supply ice in the area of your operation. However, in determining the amount of adjustment, the Director or his authorized representative will consider prevailing prices of ice in your area and the amounts by which ice prices were increased generally between the outbreak of the Korean war and the issuance of the General Ceiling Price Regulation.

(c) Whenever your ceiling prices are adjusted under this regulation, the Director or his authorized representative will, if you have requested it and to the extent it appears necessary, authorize those purchasing ice from you for resale to increase their ceiling prices by adding to the latter prices the dollar-and-cents difference between your ceiling price under the General Ceiling Price Regulation and your new adjusted price.

SEC. 5. *Who may disapprove an adjustment.* The Director of Price Stabilization or his designee may disapprove an adjustment made by one of his authorized representatives whenever he finds that the adjustment was not a proper one under this regulation. However, if he finds that an adjustment is nevertheless warranted under this regulation, he may order a new superseding adjustment.

SEC. 6. *Continued applicability of General Ceiling Price Regulation.* All provisions of the General Ceiling Price Regulation, except as modified by this supplementary regulation, continue to apply to you even though you may be authorized under this regulation to adjust your ceiling prices.

Regional and District Offices

Under Price Control Authority the United States has been divided into fourteen regions, each region having a number of district offices as follows:

Region I. 18 Tremont St., Boston, Mass. District offices: Hartford, Conn.; Portland, Me.; Boston, Mass.; Springfield, Mass.; Manchester, N. H.; Providence, R. I.; Montpelier, Vt.

Region II. 2 Park Ave., New York, N. Y. District offices: Newark, N. J.; Trenton, N. J.; Albany, N. Y.; Buffalo, N. Y.; New York, N. Y.; Rochester, N. Y.; Syracuse, N. Y.;

Region III. Commercial Trust Bldg., Philadelphia 2, Pa. District offices: Wilmington, Del.; Camden, N. J.; Erie, Pa.; Philadelphia, Pa.; Pittsburgh, Pa.

Region IV. 900 North Lombardy St., Richmond, Va. District offices: Washington, D. C.; Baltimore, Md.; Charlotte, N. C.; Raleigh, N. C.; Norfolk, Va.; Richmond, Va.; Charleston, W. Va.

Region V. 147 Hunter St. S. W., Atlanta, Ga. District offices: Birmingham, Ala.; Montgomery, Ala.; Jacksonville, Fla.; Miami, Fla.; Atlanta, Ga.; Savannah, Ga.; Jackson, Miss.; Columbia, S. C.; Memphis, Tenn.; Nashville, Tenn.

Region VI. 1101 Euclid Avenue, Cleveland, Ohio. District offices: Louisville, Ky.; Detroit, Mich.; Grand Rapids, Mich.; Cincinnati, Ohio; Cleveland, Ohio; Columbus, Ohio; Toledo, Ohio.

Region VII. 9 West Washington St., Chicago 2, Ill. District offices: Chicago, Ill.; Peoria, Ill.; Springfield, Ill.; Indianapolis, Ind.; Green Bay, Wis.; Milwaukee, Wis.

Region VIII. 620 Marquette Ave., Minneapolis, Minn. District offices: Duluth, Minn.; St. Paul, Minn.; Helena, Mont.; Fargo, N. D.; Sioux Falls, S. D.

Region IX. 112 W. Ninth St., Kansas City, Mo. District offices: Des Moines, Iowa; Wichita, Kans.; Kansas City, Mo.; St. Louis, Mo.; Omaha, Nebr.

Region X. 3306 Main St., Dallas, Tex. District offices: Little Rock, Ark.; New Orleans, La.; Shreveport, La.; Oklahoma City, Okla.; Tulsa, Okla.; Dallas, Tex.; Fort Worth, Tex.; Houston, Tex.; Lubbock, Tex.; San Antonio, Tex.

Region XI. 520 Central Bank Bldg., Denver, Colo. District offices: Denver, Colo.; Albuquerque, N. Mex.; Salt Lake City, Utah; Cheyenne, Wyo.

Region XII. 870 Market Street, San Francisco 2, Calif. District offices: Phoenix, Ariz.; Fresno, Calif.; Los Angeles, Calif.; Oakland, Calif.; Sacramento, Calif.; San Diego, Calif.; San Francisco, Calif.; Reno, Nev.

Region XIII. 1110 Second Ave., Seattle, Wash. District offices: Boise, Idaho; Portland, Oregon; Seattle, Wash.; Spokane, Wash.

Region XIV. Suite 403, 1405 "G" St. N. W., Washington, D. C. District offices: Juneau, Alaska, Agana, Guam; San Juan, P.R.; Honolulu, T. H. St. Thomas, V. I.

Ice Industry Advisory Committee

Members of the ice industry who have been named by OPS to the ice industry advisory committee are: E. F. Condon, Los Angeles, Calif.; J. Reimer Espey, Denver, Colo.; Peter A. Buehrman, New York, N. Y.; Harold O. McLain, Chicago, Ill.; Wm. A. Schmid, Chicago, Ill.; J. C. Thompson, Dallas, Tex.; George Steers, Kalamazoo, Mich.; Allen Rushton, Birmingham, Ala.; Wm. J. Ayers, Memphis, Tenn. and Wm. P. Wagg, Philadelphia, Pa.

Interpretations

A bulletin from the National Association of Ice Industries accompanying the order emphasizes that this is not a "tailored" regulation such as ice eventually obtained under OPA during World War II but is instead a general regulation permitting the ice man to apply for adjustments in price on a local or regional basis, according to the individual plant's location.

Section 4, telling on what basis adjustments will be granted, and by whom, is an excellent guide to the "slant" which applications should take. This is actually a selling job—it is up to the applicant to present his individual case in as convincing a manner as possible. Facts must be kept accurate but they must also be made complete and emphatic.

These price actions have been pushed through as rapidly as possible by OPS in order to give ice companies this vital relief while the present season is still at its height. They became effective August 1 and ice men who are contemplating applying for relief, are urged to make application immediately to get full benefit. They are asked to remember that the District or Regional OPS Director is authorized to pass upon the application, it does not have to go to higher authority. So a complete selling job should be directed to the local Director.

Those who have worked with OPS are satisfied that this regulation is the best that could have been expected, and they will be very much interested in how it will be administered. Experience alone will tell the extent to which it will meet the needs of the ice industry while at the same time furthering the objectives of the Defense Production Act.

Kansas Floods Keep Icing Docks Busy

THE Santa Fe Railroad yard's icing docks at Sweetwater, Tex. with a capacity of twenty refrigerator cars at one operation was doing double duty the middle of July handling rerouted fruit cars from California because of the Kansas floods. Several extra trains a day routed by way of Sweetwater and Fort Worth were re-iced in addition to routine business.

The Ice Industry

Canadian Ice Advertising

THE greatest advertising and publicity program ever conducted by the Canadian Association of Ice Industries has just been completed with 55 insertions throughout June in daily newspapers, and also the two leading women's magazines, Canadian Home Journal and The Chatelaine, carried quarter page spaces. During April, May, and June more than 12,000,000 individual messages appeared promoting ice and ice refrigerators.

Throughout the spring months subscribers to Canadian Ice Foundation were supplied with advertisement reprints, newspaper mats for local advertising as well as blotters. A special promotional letter was mailed mid-May to all principal retail furniture stores urging strong advertising and merchandising of ice refrigerators. Theme of this letter was "Feature ice refrigerators . . . in your showroom . . . in your window . . . in your newspaper advertising."

This program constitutes the spring and summer campaign of the Canadian Ice Foundation and is supported by ice dealers right across Canada from Halifax to Victoria. Plans are now being laid for the fall and winter national campaign. Two important themes will be "continue ice service through fall and winter" and "ice cubes and/or crushed ice for entertaining."

Commentator Retracts Adverse Comment on Ice

RECENTLY Jack Sterling, who has a "wake up" program on WCBS (New York) every weekday morning declared that the iceman was going the way of the cigar store Indian. His comment brought a prompt letter from the Public Relations Department, National Association of Ice Industries.

On his radio program the next day, he expressed regret that he was in bad with the iceman and then read the letter which he hoped would explain itself. It got in some good talking points for ice, such as increasing sales, many new uses, over 9 million homes having ice refrigerators, the cleanliness of ice. And then he acknowledged the letter as follows:

"Thank you, Mr. Timmons, for setting the record straight. Some startling information there! I had no idea that the iceman was still as important a guy as he sounds to be. So, to all our icemen friends: 'I'm sorry!' "

Modern Magazine Publicity Highlights Peak of Ice Season

WITH the 1951 ice season at its peak, the winter and spring spadework of the National Ice Public Relations Department began to show results. By the middle of August several favorable mentions of iceman's ice had appeared in top magazines and newspapers.

As mentioned in the July issue of ICE AND REFRIGERATION, the June 18 issue of Life magazine contained a three-page full color presentation "Cooking on Ice", which is a complete guide to hot weather meals. Each dish is illustrated in color surrounded by blocks of real ice.

Behind the Scenes

A behind the scenes report of just what has involved in setting the stage for this four-color spread is told by Stanley Rayfield of the Life staff, in a story published in "Today", by the Public Relations Department.

Problems involved in getting the pictures for this modern living story were formidable and amusing. When 3,000 pounds of ice arrived at Life's studio, the blocks couldn't be put into the tiny elevator. It began to melt in the lobby while arrangements were being made to carry the ice upstairs. A crowd gathered, fascinated by the ice blocks with frozen objects inside. The building superintendent tartly remarked that "this is not Madison Square Garden and the building is not designed to house traveling elephants.

When the ice finally arrived at the studio, the story had to be "shot" at top speed. Life photographer Eliot Elisofon had every movement timed like a problem in logistics. His problem was to shoot the story in color faster than the ice melted under the heat of the floodlights.

A refrigerator had been installed to keep the perishables crisp and fresh. Dishes had to be prepared in advance. The scenes, planned in advance, were set up at top speed and photographed before objects could melt or wilt.

Two men from Time, Inc.'s maintenance department with giant mops spent the entire day mopping up water, while the staff slithered around with wet feet. They hovered anxiously around the fringes of the picture ready to plunge forward to save dishes and glasses laden with fruits and desserts from slipping to the floor. The lone casualty occurred among the parfaits. Just as the last picture was taken, two of the parfait glasses slipped to the floor and were shattered.

The watermelon picture was really a problem. The cracked ice melted faster than the solid blocks. It took a long time to set up the watermelon still life. Fruit and leaves around the watermelon were put in place as rapidly as possible. One of reporter Jeanne Stahl's jobs was to squeeze drops of water on the rosebuds with an eye dropper. When all was about ready, editor Mary Hamman noticed that no green rind of the melon was showing. So, hastily, the other better-shaped half was scooped out, filled with fruit and flowers and substituted. Meantime the ice continued to melt.

Freezing objects inside of ice usually takes longer, but for Life the Knickerbocker Ice Company, New York, managed to turn out the two huge blocks shown in the picture in two days.

Other Magazine Publicity

In the July issue of Holiday a full color full page illustration included an ice picnic chest with bottles and glasses imbedded in crushed ice. Another photograph shows the picnic chest with tray resting on a table. Crushed ice is very apparent. The caption reads: "Picnic ice chests are available, some with metal trays for carrying meats, salads, and whatever should be kept cool."

Holland's Magazine, which has a circulation of 503,109 in the Southern states, ran a photo of an ice cream freezer with a recipe for coffee ice cream in its July number. Both were supplied to the food editor, Christine Millar, by the Public Relations Department.

Today's Woman (circulation 1,133,231) ran a full-page picture of several summer dishes on a bed of sized ice in its July edition.

Your New Baby was scheduled to show an ice picnic chest in its new product section in July.

An article on Dr. John Gorrie, written by John G. Pool of NAII, was accepted by The American Weekly Sunday supplement with a combined circulation of 9,815,159. A similar article, prepared by free-lance writer Harold Helfer with the help of NAII, was purchased by Nation's Business (circulation 735,241) for publication in August.

A general story about the ice industry was on the editorial schedule of American Business (circulation 14,833). This also was furnished by the Public Relations Department.

On page 144 of the June issue of Woman's Home Companion is shown how to make ice-cold punch for a party. The sides of a galvanized tub are shown covered with wire mesh and decorated with flowers. The tub is then filled with cracked ice and a glass punch bowl inserted in the middle.

The August issue of Esquire carries a page advertisement in full color, a large portrait of a beautiful young woman under a fetching headline "want to have a party mister?" The text of the advertisement points out that nobody wants warm drinks and cold conversation, that extra ice means extra sparkle in the drinks, and that if the ice runs out, so do the guests.

Advertisements in the national consumer magazines continue to promote ice and ice-using appliances. Seven top magazines with a combined circulation of 24,236,546 gave a total July readership of 72,709,638.

The official organ of the Calcium Chloride Association ran a feature article about ice in its April issue. Headed "Cube, Cake, or Crushed Ice Here to Stay," the story was occasioned by the May 6 anniversary of the Gorrie ice machine patent. General facts about the ice industry and its history comprised the first two-thirds of the article. The final portion described a typical small ice company, the R. B. Whitaker & Son plant in Millville, N. J., mentioning that calcium chloride brine has been used in the plant since 1917. Closing paragraph said, "So when you next ask for a coke, stop to think how it was made cold and refreshing for you . . . you bet, ice is here to stay. Thanks to Dr. Gorrie and the ice industry."

Newspaper Publicity

The lineup of summer ice publicity in newspapers is led so far by a really outstanding item in The New York Times. Almost simultaneously, Jane Nickerson, food editor of the New York Times received two news releases which discussed the qualities of iceman's ice. One came from the

NAII Public Relations Department the other from Bill Treadwell, director of information of the Tea Bureau.

The idea that iceman's ice is far better than that made in a home refrigerator obviously appealed to her. She checked the accuracy of the information from two sources—the Tea Bureau (Treadwell) and Knickerbocker Ice Co. of 226 E. 55th St., New York City. She must have gotten the "right" answers because the July 3 issue of the Times carried the iceman's ice story. In her column, "News on Food", the headline read: "Iceman's ice is Pronounced Far Better Than the Kind That Home Refrigerator Makes."

Practically the entire column is devoted to the finer qualities of iceman's ice, slower melting, crystal-clear, doesn't dilute drinks, and purified—all in detail with explanations why. She gives two excellent recipes for punch, one with coffee and the other with tea as a base, which require "a large piece of ice" for chilling.

Another story on the food page of the same issue of the Times features a picnic ice chest which holds up to 300 ice cubes.

Once again good relations with the Tea Bureau have paid in better publicity. This Bureau, with one of the nation's outstanding publicists, has gone all out for the use of ice.

The Ice Industry

This Hog Kept Cool on Ice

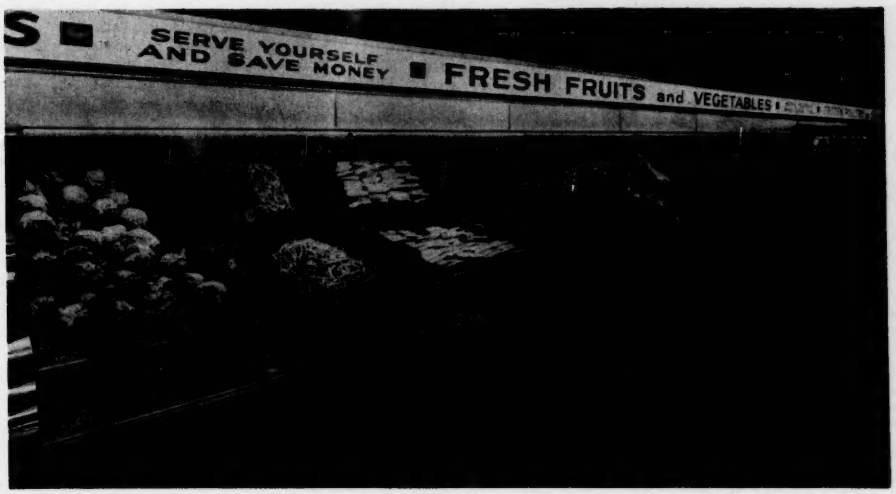
A FARMER approached Hal Burke, livestock trader, San Angelo, Tex., and said he had a hog for sale. It was in the trunk of the man's car.

"Goodness," Burke exclaimed, wiping his brow in the 99-degree weather. "It'll be dead by now."

"Oh, no," the seller replied. "Got him on ice."

And he was right. The hog was fresh as a daisy—bedded down between two blocks of ice. Burke bought the hog.

It Took a Lot of Selling — But They Sold Kroger on Vegetable Icing



This modern iced vegetable display case has been installed in the Kroger super market in Michigan City, Ind.

A NEW super market was opened the middle of July in Michigan City, Ind., by The Kroger Company, equipped with new type super market vegetable display cases. Located along one side of the store, the new cases represent the last word in modern vegetable display and they make a very attractive appearance. The vegetable display case is 30 ft. long.

Although these cases are designed specifically for the use of crushed ice, for the purpose of the picture reproduced here, the ice was removed so that the quality of the produce could be seen. All of this produce had been brought in from the Chicago wholesale market packed in ice. It was imbedded in crushed ice in the cases and immediately after the picture was taken, several pounds of ice were spread over the top. To the right of the produce display there are two open ice display racks that will be used for promotional sales such as melons, grapefruit, berries, etc. These are 20 ft. square.

These cases were sold by B. H. Landing of the Lake City Ice & Coal Co. of Michigan City and Al Trusty, president of Trusty Manufacturers, Inc., La Porte, Ind. Their installation represents the fulfillment of over three years intensive work with The Kroger Co. managers. They were loaned cases; they were helped with special promotional sales; they were even given ice at various times so they could prove to themselves that they could really do things with ice that would help them sell more produce and make a greater profit, but above all would allow them to offer to the purchaser better quality produce full of food values. The ice cost is approximately one-half of one percent of the produce handled.

The story was even carried to the home office of The Kroger Company in Cincinnati and this personal selling helped to put the deal through.

Crushed Ice for Fresh Meat—As Told To an Ice Man by a Butcher

FOLLOWING is the summary of a transcription from a tape recorder of an actual conversation between R. W. Davis of the Union Ice Co., San Francisco and Grover C. Puckett, manager of the meat department of Leonard's Super Market, San Francisco. The recording was made in the Leonard Market.

DAVIS: How long have you been in the meat business?

PUCKETT: About five years.

DAVIS: I understand you decided to experiment with ice in your meat case. How long ago did you try that?

PUCKETT: About three months ago.

DAVIS: How did you put the ice in the meat case?

PUCKETT: Well, at first I wasn't so sure it would work and I tried only one section of the counter and when I found it would work I talked to a man from the ice company and got them to let me use ice for one month at their expense.

DAVIS: This is crushed ice you are using?

PUCKETT: That is right.

DAVIS: You are putting that under your shelves?

PUCKETT: In under the shelving, yes.

DAVIS: How many feet in your meat case?

PUCKETT: 36 feet.

DAVIS: And how old are they?

PUCKETT: They will be two years old tomorrow.

DAVIS: As I see it here, the ice does not come in contact with your meat pans or the meat, does it?

PUCKETT: No, it does not.

DAVIS: It is right under your shelving.

PUCKETT: Yes, sir, it is.

DAVIS: In a general way, what has been the result since you started using ice?

PUCKETT: A cross-rib roast weighing twenty pounds was held in the counter for forty hours and the shrinkage was absolutely none. The same cut of meat, the same age, was hung in the walk-in box for forty hours and the shrinkage was three-quarters of a pound. A cross-rib roast retails in our market for 93 cents a pound.

DAVIS: Are there any problems, under regular conditions, of odors around the meat department?

PUCKETT: In the meat cases, the ice keeps the air fresh and clean. Evidently the ice melting carries the odor right on down the sewer.

DAVIS: As a butcher in operating a meat department, what are your main headaches? What do you have to watch out for or have to do to keep that meat in saleable condition?

PUCKETT: One problem is that if a steak lays in the counter too long it dries out on the surface, turns dark, and has to be trimmed.

DAVIS: Now that trimmed meat, what do you ordinarily do with that?

PUCKETT: It is used in hamburger.

DAVIS: In other words you are taking high-priced steak and grinding it up into hamburger?

PUCKETT: That is right.

DAVIS: With the labor thrown in?

PUCKETT: That is right.

DAVIS: Since using ice has there been any difference in the amount of trimming, discoloration, darkening of the meat?

Meat Keeps Better

PUCKETT: The meat doesn't darken near as fast. Since I have been using ice, I can keep a steak in the counter for five to six days and it will still be saleable without trimming it.

DAVIS: How long could you keep a steak without ice?

PUCKETT: Two days was the limit.

DAVIS: About what are your steaks selling for a pound now?

PUCKETT: Top round steak is 98 cents a pound. Bottom round steak is 93 cents a pound. Sirloin steak is 95 cents a pound. T-bones are 98 cents. Porterhouse steaks are $1.05. Market steaks are $1.49. Club steaks are $1.49 and New York steaks are $1.60. Filet steaks, $1.80 a pound.

DAVIS: In other words, just a few ounces saving on that trimming and shrinkage loss really runs into money, doesn't it?

PUCKETT: It certainly does.

DAVIS: How about ground beef? Is that any problem in the average market?

PUCKETT: Ground beef is a problem in every market. We handle only a limited amount and sometimes it moves slowly. If you have too much, you just lose it.

DAVIS: Ordinarily how long does ground beef keep in saleable condition?

PUCKETT: Without ice one day is all. With ice it will keep two or two and a half days.

DAVIS: How about roasts?

PUCKETT: Roasts will hold up just like the steaks for a week or longer, with ice. Without ice they nave to be trimmed every other day.

DAVIS: What are the problems on stew meat?

PUCKETT: We don't have much trouble with the stew meat, it moves out faster. But the pan is never full of juice like it was before, therefore it is not shrinking.

DAVIS: What are the problems ordinarily in handling luncheon meats?

PUCKETT: Luncheon meats curl up in the counter due to the fact the counter is dry and they get stale and slimy much faster than when using ice. Now we can leave it three to four days.

DAVIS: How about corned beef?

PUCKETT: I have put corned beef on ice and the brine doesn't drain out of it. I set it right on the ice.

DAVIS: Have you noticed any increase in the sale of any of your meat since you started using ice?

PUCKETT: I have noticed an increase in my steak sales.

DAVIS: Why do you think the steak sales have increased?

PUCKETT: Instead of running into the bottom of the pan, the juice stands on the steaks and makes them look like all fresh cut.

DAVIS: What has color to do in the sale of meat?

PUCKETT: When steak turns dark the first thing the customer thinks is that it is stale, but as long as it stays bright and red they know it is fresh.

DAVIS: Have you any idea about the retail value of the meat in this 36 feet of case?

PUCKETT: I have right now about $600 worth of meat in the counter.

DAVIS: So shrinkage and trimming is really a big factor?

Trimming Means Waste

PUCKETT: As far as I am concerned whenever you trim it is just about gone.

DAVIS: How much ice are you using?

PUCKETT: Over two to three months time it will average about $3.00 a week.

DAVIS: Did you have your compressor adjusted after you put the ice in the case?

PUCKETT: Yes, I did. My counter was freezing when I first put the ice in the case and I had the counter adjusted to suit the ice.

DAVIS: Well then, considering all this saving in shrinkage and trimming losses, your increased sale due to better color and $3.00 a week, that is really peanuts isn't it?

PUCKETT: That is right. In other words, we are making money by using the ice.

HOW TO TRAIN THE SUPERVISOR

Manager of Canadian ice plant gives pointers on training supervisors to fill their responsibilities and having the know how of building morale among the other employees

I. GREENBURG
Purity Ice & Fuel Co.
Toronto, Canada

The author of this paper is a man of wide experience in the ice industry and is well qualified to discuss the place, duties, and responsibilities of ice company supervisors. A capable supervisor, he says, will go a long way toward producing an efficient and well functioning organization.

NEXT to the boss, the most abused man in the average ice company organization is the supervisor. He is the fellow who at one time or another has done or will be doing, just about every job possible in the organization.

Supervisory management of the ice industry is now challenged to provide the material and guidance which will patiently and systematically train its employees in the fundamentals of courteous and efficient service and professional selling practices and then interest them in using the knowledge thus gained for the benefit of all concerned. Employees generally reflect the attitude of management, no matter whether that attitude is aggressive or indifferent and it is a determined fact that no enterprise has ever achieved its full measure of success without planned leadership by executive and supervisory management.

Fear in some form has a tight grip on top management of the ice industry. I believe that fear still persists pretty generally and we lack confidence in our future. Many companies are afraid to sell ice using appliances. Yet these appliances can be sold in any town if the customers are contacted.

Processed Ice Sales

Why aren't there more ice companies providing facilities for sized ice, or crushed ice? Some will tell you that sales won't justify the cost involved. Others are afraid they cannot increase the price of ice for this particular service. Others are just afraid to make the additional investment to meet the current demand.

And why aren't our employees better trained? It is my opinion that the reason is because somebody in top management is either afraid to put forth the effort or they are inadequately or insufficiently trained themselves to build a trained organization.

Ice management has a responsibility to its labor. And management has been trying to escape there responsibilities. Management must not only be able to accept responsibility but also be able to advocate responsibility. In order to build your business on a solid foundation, you must have harmony, fellowship and unity.

Three Legs to Good Employee Relations

I have three steps to this ultimate. It is likened to a three legged stool. For a three legged stool wherever it is set down forms a solid foundation. A four legged stool needs a level surface to form the same foundation.

Leg. No. 1. You Shall Know the Truth. Provide employees with the facts of management. I don't mean for you to divulge your financial status or set-up, but explain how management functions. What management looks for in determining leaders. What the possibilities are.

Leg No. 2. Do Unto Others As You Would Have Done Unto You. You have heard that before, so I need not dwell on this only to say, expect to be treated by your employees in the same manner as you treat them. To command respect, you must give respect.

Leg No. 3. Love You One Another As I Would Love You. This does not mean to greet them as a long lost brother, to clasp them to you and put your arms around them. You have men in your organization that you cannot tolerate. Yet because they are doing a good job you tolerate them. You keep them at arms length. There is a lack of harmony. This situation is dynamite. It should be rectified, because this can have far reaching repercussions.

Supervisor Acts For Management

The problem of Management is getting things done. And in order to get things done, management must have able lieutenants. The job is not specific or individual. Management must be able to groom the man for the job. Management must be able to communicate the know how to the supervisor. Management must be able to endow the supervisor with the responsibility that goes with the position. And to uphold this responsibility he must be given some power. Because where there is responsibility there must be power.

The Supervisor must be a leader. He must be liked well enough by the men that they will glean the teachings from him. The calibre of work is affected by the way it is supervised. Much of the inadequacy of supervision as it is practiced today in the ice industry is undoubtedly due to the fact that the industry itself has not yet definitely decided what a route supervisor and other supervisory personnel should be and just what they should do. This rather vague idea of activities seems to be the result of a general practice of loading supervisors with almost any work that is not the specific duty of someone else. Our route supervisors have been nothing but flunkies—not real foremen—because the manager has always found them too handy. This attitude is true to a great extent throughout the entire ice industry over the country as a whole.

In a survey taken several years ago, from a number of ice companies on the typical job of a route supervisor, the compilations of the results are as follows:

Duties of Supervisor

Title: Route Supervisor, or Route Foreman, or Route Superintendent.

Duties: 1. *Selection of Men*

Inform manager when man is needed. Make final selection of new man. Because it is on his say so, if the man is kept or not. Assign man to the route.

Paper presented at spring ice conference of Canadian Association of Ice Industries, April 10, 1951.

2. *Train Routemen*

Show new man how to do the job. Assist with training of new man. Train men in safe practices. Inform new men of company rules and information. Inform men of changes and new ideas.

3. *Ride the Route*

Check route books. Check men's appearance. Check driving habits. Check condition of equipment. Check service practices. Correct improper practices. Substitute for absent routemen.

4. *Help Routemen Sell*

Demonstrate selling techniques. Provide sales literature. Correct poor selling techniques. Stimulate sales activities of routemen. Make surveys. Give men leads or prospects. Supervise installation of new appliances.

5. *Hold Individual Conferences with Men*

Correct improper practices. Keep mne on the job regularly. Handle men's complaints. Maintain discipline. Keep up morale.

6. *Plan and Direct Work*

Plan routes. Assign quotas. Delegate work. Give orders to men.

7. *Evaluate Men*

Keep records of complaints, difficulties, good work. Make regular rating reports on each man.

8. *Recommend Changes in Personnel*

Inform manager when force needs to be reduced or increased. Recommend men to be laid off. Recommend "firing" when necessary. Recommend men for transfer or promotion.

9. *Carry out Safety Program*

Train men in safe practices. Enforce safety rules. Investigate accidents. Report accidents. Carry out all safety policies and activities established by management.

10. *Handle Customer Complaints*

Get customer's story. Investigate complaints. Correct complaints.

11. *Prepare Record and Reports*

Record and report sales on routes. Prepare rating reports on employees. Report defective trucks and equipment. Record prospects.

Requirements of Supervisor

Age—30 to 45—Married preferred —High school education preferred.

Personality: Appearance, neat, clean, well-dressed; voice, pleasant, clear, convincing; courtesy, high degree.

Intelligence: Above average. Must be able to grasp ideas, interpret ideas from reading and discussion.

Cooperation: High Degree. Must be able to work with routemen, other supervisors, manager, and all employees.

Tact: High degree. Must be able to handle employee and customer problems.

Loyalty: Must be loyal to the company and men.

Fairness: Must be able to treat all men alike.

Dependability: Must be able to assign him a job and know it will be done honestly and satisfactorily.

Judgment: Must judge men, judge solutions to problems, and make decisions.

Initiative: Must have ability to devise new ways, new ideas. Must be able to go ahead and get the job done.

Physical Requirements: Strength—Average.

Experience Required, experience as a routeman.

The competent route supervisor will take a heavy load off the manager's shoulders by selecting delivery men, training them and then having the knack of directing them in their work so they will perform in the most effective manner possible. Good supervision means that the men will do their work when it should be done and according to the standards of performance that the job requires.

Skills: Mathematics, basic arithmetic; writing, legible, well-organized, simple; talking, very important, must be able to present ideas clearly and convincingly; clerical, make simple reports and record, keep files; mechanical, none, but it helps; supervisory, most important, must be able to give and take orders, train men, correct men on the job, and lead men to better efforts.

There it is. We are not looking for a man, but a saint.

The manager should determine from the above, the duties that apply to the Route Supervisor in his company.

In brief, the essential duties of a supervisor might be listed as follows:

Know what you expect a man to do.

Let him know what you expect him to do.

Get him in the proper attitude to do it.

See that he does it.

Let him know how he did it.

Good supervision requires that the supervisor get men under his jurisdiction to do the job when it should be done and according to the standards of performance required

A route supervisor should not be asked to look after any more than eight routes. This gives him the opportunity of checking a route at least three times a month. And in the event he has to substitute for absent routemen, at least twice a month.

Adequate Remuneration

To make the position of route supervisor desirable, the rate of remuneration must be desirable. There are several methods of paying route supervisors.

1—A flat weekly rate of pay, which may be adequate but not desirable because there is no incentive. Say for arguments sake, your supervisors pay is $50 a week. He is quite content in the slow season when route pays are at their lowest. But when route pays are up in season, and he sees drivers making much more money than he is, he is not so content.

2—The weekly average rate of pay the routes and drivers that he is responsible for, with a minimum guarantee. The guarantee to be higher than the drivers guarantee. For example. Your route suprevisor has jurisdiction over eight routes. The total pay for the eight routes is $406. The average pay for these routes is $50.75. That would be his pay. This offers some incentive. If the men under his jurisdiction make more money, so does he.

3—The average rate of pay over the drivers minimum guarantee, added to his guarantee. For example: The drivers minimum guarantee is $40 a week. The route supervisors guarantee is $45. The average rate of pay for the week, taking the prior example is $50.75. This is $10.75 over the drivers minimum guarantee. Add this to the Supervisors minimum of $45 makes his pay $55.75.

Competitive industries are all vieing for the same type of labor that we are. And although some are offering a better rate of pay and some are not, they are all offering better benefits than the ice industry. And as in the past years, we may be thankful for our route inspectors and for the loyalty they have for us. And when you think the situation is at its grimmest, when the morning is humid and warm, and several drivers haven't shown up, and maybe you have had a breakdown some place, and you, just sit down for a moment and relax, and reflect that things could be a lot worse.

Crystal Clear Ice and Sanitary Delivery Saved Ice Customers

ELIMINATION of all foreign matter and production of crystal clear ice cubes are a must to the ice distributor serving taverns. So reports Richard Fisher, sales manager of Ice Delivery Inc., Fort Wayne, Ind. This was brought home to the Fort Wayne ice company when ice cuber salesmen began trying to convince tavern owners that ice company ice was not clean. Realizing the damage such statements could do, Mr. Fisher called on a number of tavern owners and learned from some of them that a drink sometimes would contain small fragments of wood or other foreign matter. Also the glass frequently would be left with a lime ring.

The answer was coreless ice. This not only eliminated all foreign matter but the cubes were crystal clear all the way through. The same was true of crushed ice.

During October last year, 19 vegetable ice cases were installed in Fort Wayne. After these cases had been in use a few weeks complaints began to come in that when the night covering of ice melted away it left white rings around the vegetables. One groceryman claimed that the lime turned his radishes from red to purple. The answer again was coreless ice, and since using it there have been no further complaints from grocerymen.

After starting this method of making cubes and crushed ice they found that the bottom part of the shells would still have a little foreign matter, which was eliminated by carefully flushing the cans before filling for freezing. Forrest Hodge, platform foreman, now takes great pride in producing clean, crystal-clear ice.

Making Coreless Ice

The method used here for producing coreless ice is to remove the large 400-lb block from the can when all but the core is frozen. Then the large block is cut into pieces of about 100 pounds each which makes a better fit for the crusher. With this smaller piece of ice the teeth of the crusher operate with a cutting instead of a scraping action.

There is a great saving in freezing time when coreless ice blocks are produced. Without change in the brine temperature Mr. Fisher reports that the blocks are frozen in 60 per cent of the time required to freeze the standard blocks. This represents a worthwhile saving in time and expense as well as obtaining ice of much higher quality than was possible by the standard methods formerly used.

It is not desirable to review the production methods and results in detail here. A rather complete analysis and production directive on coreless ice was published in ICE AND REFRIGERATION, July 1944, page 25. It drew on the experience of one enthusiastic user of the method and gave the full basis of operations as well as directions for shifting plants over to coreless ice block production.

The economic side and basic factors involved were contained in a convention address presented by Emerson Brandt to the National Association of Ice Industries. It is printed on page 257 of the proceedings of the 1943 convention of that association.

Mr. Fisher emphasizes the excellent quality of the sized ice made from coreless blocks. It is not only completely clear with no white pieces but also is more cleanly broken with a minimum of fine ice and snow. In most markets that represents better customer acceptance and a saving in an unwanted by-product of the sizing operation.

Ice Company Provides Icing Service for Produce Trucks

AN ICE crusher-blower has been installed by The Vigo Ice & Cold Storage Co., Terre Haute, Ind., to provide a service of icing trucks with loads of perishables. According to E. H. Mewhinney, manager, the machine is capable of producing two tons of crushed ice in approximately fifteen to twenty minutes. Block ice is fed into the unit, and the crushed ice resulting from the process is blown into the load through a 15-foot hose, completely penetrating the entire cargo. This thorough method of refrigeration eliminates the 15 to 20 percent loss normally encountered due to heat from the top of the truck.

This new service is in keeping with the program which the company has adopted to maintain the most efficient service for customers. Vigo ice has been servicing citizens of Terre Haute and the surrounding territory for the past 54 years, manufacturing and distributing quality ice.

The plant was completely renovated and modernized two years ago at which time all new electrical equipment was installed. Water for making ice is obtained from the company's deep wells and treated to remove all bacteria and foreign matter.

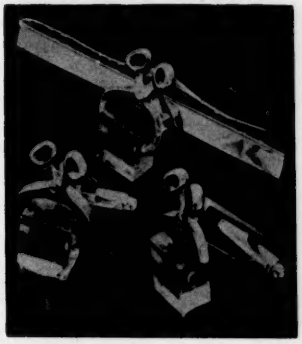
The Ice Industry

Ice Exhibits at State And County Fairs

DURING recent years, the Indiana Association of Ice Industries has taken an active interest in icing perishables at State County and 4-H Fairs. Recognizing that there was a definite need for ice protection in the horticulture exhibits of these annual shows, and that this was an excellent means of getting the product before the public eye, ice and display equipment is furnished to the 4-H groups exhibiting at the State Fair. The practice of icing the prize winning perishable exhibits at the State Fair has now been accepted as standard procedure by the Fair Board. The idea of icing prize winning horticulture exhibits quickly caught on at the local level and each year has seen a steady increase in the demand for ice protection at county and 4-H fairs.

This type of promotion, according to Robert Walton, secretary of the Indiana Association of Ice Industries comes under the heading of consumer education, and it is often difficult to evaluate results of such programs. However, he says they do know that ice vegetable displays are fast becoming the accepted method of fruit and vegetable selling and they believe that all such activities make a valuable contribution to the total effort.

Ice Man's Jewelry



You may think it's been "hot" this summer but some have found a way to get that "cool look." Miniature ice tongs holding pieces of simulated ice have been made into cuff links and tie bar sets. The jewelry is called "Frozen Assets" and is available at department or men's stores.

The Ice Industry

Values of Poultry Icing Told by Akron Grocer

USING facts and a photograph furnished by the N.A.A.I. Public Relations Department, the Progressive Grocer in a recent issue carried a full page story on Edwin J. Porter, the Akron, Ohio, grocer whose success in the use of poultry icing was described in the March ICE AND REFRIGERATION. Basis for the story was the poultry icing test conducted in his Super Market last year by the Serv-Ice Delivery Company of Akron. The test compared weight loss in iced and un-iced chickens over a period of a week, graphically proving the value of ice. Mr. Porter has since used ice in his mechanical poultry case, resulting in doubled sales.

These facts were outlined in The Progressive Grocer under the headline "Iced Display Doubles Poultry Sales". An accompanying picture showed Mr. Porter beside his poultry display. His testimonial will receive added circulation later in an ice ad to the grocery trade. To Jack Wightman of the ServIce Delivery Company goes credit for planning the poultry test and supplying the information on it.

Ice Executive Resigns

THE resignation of Arthur Peine as manager of the Manhattan (Kans.) Ice & Cold Storage Co. was announced by Ben Saroft, president of the company. Mr. Peine was one of the organizers of the company, and served as president for several years.

He is a past president of the Kansas Association of Ice Industries, also past president of the Kansas Poultry Institute and was the official U. S. Delegate to the World Poultry Congress in London in 1930. In Manhattan, he has been president of the Chamber of Commerce and the Rotary Club, member of the library board, and director of the First National Bank.

Ice Man Trusts Customers

THE operator of the Alger Sales agency at La Crosse, Kansas, trusts people. From now throughout the summer, if all goes well, the ice house will be open on Sundays with no employees to operate it. People needing ice will find it cut in convenient chunks. A box is hooked to the wall for payment. The system, recently started, has worked out well thus far, L. R. Alger, owner, said.

American Ice Shows Increased Earnings

OPERATIONS of American Ice Co. improved materially in the second quarter over the similar period a year ago and the first three months of this year it has been reported. It is likely the company will report net profit of around $75,000 for the June quarter, which would compare with a net loss of $9,543 in the corresponding quarter of 1950. On this basis the net loss of $131,182 reported for the March quarter this year will be cut to approximately $56,000 for the six months, or about half the $113,348 deficit in the first half of last year.

The company is in a more favorable operating position than at this time a year ago. The third quarter, when sales of ice are heaviest, is the most important earnings period of the year. Weather in the summer last year was not favorable, largely accounting for the drop in net income for 1950 to $136,828, or 7 cents a common share from $533,277, or $1.03 a share in 1949.

Hot Weather Boosts Ice Sales in Oklahoma

FROM Oklahoma City comes a cheerful note in this not too favorable summer for the ice man: J. C. Liebmann, operator of two ice plants, says in a newspaper interview that the 100-degree temperature during August helped the ice business quite a bit. He recalled that the ice season in that section hadn't been good since 1947, and they hadn't had a long hot spell since 1946 when there were 30 days in a row with the temperature over 100 F. A number of calls for ice have been received from mechanical refrigerator owners whose machines had gone down.

Ice Man Rescues Sweltering Residents

ON a warm day in June a Utica ice man came to the rescue of hot and bothered residents of Cooperstown, New York. Waldo Dausman, a driver for the Copeland Ice Company rolled into town with four tons of ice and was besieged by store keepers and housewives. The villagers' refrigerators had been empty of ice for a week after George F. Robinson, 19, the regular ice man, left for Pine Camp and two weeks of training with the National Guard. Earl Copeland, president of the Utica ice company, got word of the crisis and agreed to come to the rescue.

Dairies Go For Snow Ice For Cooling Milk Cans

A MILK truck pulled up to the ice platform of Ice Delivery Inc., Fort Wayne, Ind. and asked for 5,200 pounds of block ice cut in 25-lb pieces and placed on five-gallon milk cans. The platform man suggested that they pack snow-ice on the cans, but the driver was skeptical. "Do you think I'm crazy? Why I wouldn't get out of Indiana before the snow would be all gone."

The order for block ice was filled, but the driver consented to experiment with four cans packed with snow-ice. A week later he returned and ordered 138 sacks of snow for his load of milk. He reported that the snow not only held up as long as the block ice, but he found that the cans packed with snow carried a temperature of 34 F while those with block ice registered 42 F. To date this dairy has purchased more than 1,000 50-lb. bags of snow. In the meantime other dairies became interested, until now the ice plant is actually running short of what was formerly largely a waste product.

Demand for Iced Tea Grows

THE great majority of the better restaurants throughout Canada feature iced tea and iced coffee in their menus. The Tea Bureau spends many thousands of dollars each summer in newspapers, street car cards and posters promoting iced tea. And the Salada Tea Company does an excellent job every year in both daily and weekly newspapers suggesting iced tea for a fine summer beverage. One of the current Salada advertisements appearing in newspapers reads: "Discover how good iced tea can be! Make tea double strength and while still hot, pour into glasses filled with cracked ice. Add sugar and lemon to taste." Ice dealers should talk iced tea at every opportunity.—(Canadian Association of Ice Industries Bulletin.)

Free Iced Vegetables Attract Grocers

ICED vegetables, displayed in an attractive counter was one of the popular spots at the National Retail Grocers convention held recently at Navy Pier, Chicago. Visitors were invited to pick up the vegetables and "munch" on them.

The display was presided over by Andy Andrich who kept it iced and supplied replacements of celery, radishes, carrots, cabbage and lettuce. A sign above the counter invited visitors to help themselves.

Reports from Unit Ice Associations

Southwestern Ice Manufacturers Association

P. A. WEATHERRED, Secy-Counsel

GENERALLY speaking, sales of ice in Texas during these normal-for-Texas July days are running day for day above those of last season. It is not possible to estimate what the year will look like. The long, cold spring set us back badly of course. Still this year should pretty well indicate what losses to mechanical competition on the one hand, and on the other increased purchasing power together with individual efforts to maintain earnings, really mean. Generalized rules just don't seem to apply to the ice men who are alert to their opportunities. Many of these are making remarkable records of earnings as the result of adjustments they have made to meet changing markets and changing conditions.

During times such as are these now, and as they will continue to be for an indefinite period, people are inclined to indulge in luxuries. The processed ice business encompasses luxury as well as essential uses. Ice men who are not pressing this business to the utmost now, are making a serious mistake. The volume of processed ice that can be sold and the prices it will bring will go a very long way toward offsetting losses in dollar volume to the competition.

A conference of engineers will be held during the fall, the time and place being left to the decision of the Technical Committee of which Vice-president Ralph H. Irvine continues to be the chairman. Many of the engineers are regretting that the spring conference was cancelled this year. The hot weather has caught a number of plants off balance. In many instances this situation could have been prevented through a more alert attitude on the part of both management and engineers.

For the first time in twenty years, the National Association of Ice Industries is bringing its convention to Texas this year. The National convention will meet at the Shamrock Hotel in Houston during the week beginning November 11, the official convention dates being November 13-16. The men and women of the Texas ice industry thus will be given an opportunity to give a Texas welcome to their friends of the ice industry from other states and from Canada. Plans for the convention are already well under way.

The interest in industry developments throughout the country was never keener than it is at this time. Definitely the favorable midsummer season has revived the hopes and spirits of the ice men of Texas and of other sections. The National Convention will bring to Texas a cross section report not only upon the situation of the industry but upon the plans that are being laid for the future of the industry. Not only from a business point of view but from the social point of view as well, the National Convention will command the interest of Texas ice people.

The Southwestern convention for 1952 will be held at the Texas Hotel in Fort Worth. The dates will be March 12-14. The board of directors are convinced that the spring dates are preferable for Southwestern conventions. Both the attendance and the interest in the program of the Galveston convention last spring were convincing of the soundness of the decision made by the board to hold Southwestern conventions in the spring.

There is little doubt that the 1952 season is going to be written down as something of a turning point in the history of the Texas ice industry. The decreases in business since 1948 year after year have created a feeling almost of despair among many of our members. For the first time since 1947 we are having a typically dry hot Texas summer. The result is that ice industry sales are at levels that have proved to be very pleasing surprises to many of our more skeptical fellows. Certainly the major theme of the 1952 Southwestern convention will be to place in perspective the situation of the industry as reflected in this very encouraging season.

Canadian Golf Tournament

THE largest turnout of golfing Canadian icemen in many a year was on hand at Oakville June 28 to take part in the association's annual golf tournament. For the first time in fourteen years, the handsome Blue Top Trophy went back to Kitchener, due to the fine performance of John Czarney of Kitchener Tri-Pure Ice Co. who came in with a 79-9-70 score. Other prize winners were Cameron Hillmer, Milton Burt, W. J. Lavery, Bert Staples and J. E. McPherson. The services and facilities provided by the Oakville Golf and Country club left nothing to be desired, and thanks were expressed to Cameron Hillmer for arranging the tournament at his local club.

Indiana Association Of Ice Industries

ROBERT W. WALTON, Secretary

THE Poultry and Egg National Board cooperating with the State Poultry Association of Indiana and the Indiana Association of Ice Industries will conduct a retail merchandising program on poultry and poultry products early this fall. Such classes have been held in about 30 cities in Illinois, Missouri, Michigan, Nebraska, Maryland and Texas. Classes are currently in progress in Texas and Michigan.

It is expected that the retail merchandising training facilities as embodied in the training trailer of Eric Oesterle of Purdue University will be used to house the training classes. Mr. Oesterle for some time has been conducting classes in the merchandising of fresh fruits and vegetables at the retail level in the Purdue trailer.

Recently the Purdue merchandising trailer was equipped to handle classes on the merchandising of red meats, and it is expected that the equipment installed to display meats will be used for the poultry classes. The trailer facilities are adaptable to the use of ice, and it appears that there will be ample opportunity to demonstrate the effectiveness of ice in the handling of fresh poultry. The addition of the poultry school will provide a complete program in perishable icing, and should have a salutory effect on the ice business. The Poultry and Egg National Board will furnish qualified instructors for these classes, and these men are thoroughly indoctrinated in the use of ice in poultry displays.

The sweet corn season has opened in Indiana and great quantities of iced sweet corn are now appearing in markets over the state. Iced sweet corn is in great demand in city markets, and more and more growers are realizing the benefits of field icing. James D. Atkinson of the Bicknell Ice and Coal Co. has been successful in promoting the program in Sullivan County and several loads of iced corn have already appeared on the Indianapolis market from that area.

The Indianapolis branch office of Kroger Company reports the interesting fact that the sales of sweet corn were at a record high in 1950. Kroger buys the full production of Alvin Koons and John Mitchell of Flat Rock, Ind. which is by far the biggest source of iced corn in Indiana. The Kroger sales experience definitely

proves that there is a big appetite awaiting properly handled sweet corn, and that corn consumption can be increased many times if the consumer is provided with a quality product.

Commencing late this summer or early fall, and continuing for twelve consecutive months, there will appear in the Indiana Food Merchant (official publication of the Indiana Retail Grocers and Meat Dealers Association) advertising featuring vegetable icing. Cooperating in this advertising program will be Trusty Manufacturers of La Porte, Ind., manufacturers of ice display cases.

The Association cooperated with Purdue University July 31-August 2 in an annual conference for the homemakers and farmers of Indiana. Attendance was estimated at about 10,000. The association furnished display equipment for demonstration purposes.

Marketing demonstrations involving fresh fruits and vegetables, canned goods, red meats and poultry were included in one session, when some 6000 women were given instruction in the selection and preparation of quality foods. In addition to the demonstration, there was an exhibit of foods used in the demonstration. This exhibit was located in the lobby of the meeting place and attracted much attention.

Florida Ice Association

MURIEL WASHBURN, Secretary

THE 26th annual convention of the Florida Ice Association which will be held at the Sheraton Plaza Hotel, Palm Beach, Fla., October 14-16 promises to be a big event from the standpoint of good fellowship and information about the ice business.

Business sessions will be down-to-earth but up-to-date on the latest developments in the ice industry's fast changing production, merchandising and economic picture.

National, neighbor and local ice men will bring factual information on new markets for ice and new methods of getting it to customers. A college professor will tell about the rapidly increasing demand for ice in hydrocooling and members of the convention will be given an opportunity to discuss and reap the benefits of other ice manufacturers' successful ventures in the forum on profit producing side lines.

The associate members will again cooperate in making this annual meeting one that no Florida ice man can afford to miss by exhibiting the latest in ice appliances, production, maintenance and delivering equipment.

The convention will open on the afternoon of Sunday October 14 with a welcome party and close with the President's dinner and dance on the evening of Tuesday, October 16. Special entertainment and favors will be provided for the ladies.

Illinois Association Management Conference

A MANAGEMENT conference and directors meeting was held by the Illinois Association of Ice Industries at the St. Nicholas Hotel, Springfield, Ill., Tuesday, August 2. Plans for building better ice business through various merchandising methods were discussed. Seventeen ice company representatives were present.

Of particular interest was a report given by B. F. Hartline, Division of Marketing, Illinois Department of Agriculture, who is in charge of the iced sweet corn project near Anna, Ill. Mr. Hartline reported that the results of the project had been satisfactory in general although the quality of the corn had been impaired by the vagaries of the weather, too dry in the beginning and later, at the time spraying should have been done, too much rain. As a result there was some infestation which affected the quality.

There is a similar program under way at West Frankfort, in which the Agricultural Committee of the West Frankfort Chamber of Commerce is cooperating. This project is proving highly successful. Growers have shown sufficient interest in this work to encourage considerable expansion of the project next season. Mr. Hartline is preparing a complete report on the project which will describe it in detail including the icing process, marketing, and net results to growers.

A meeting of the directors was held to select a convention city and establish dates for the next annual convention, and some general discussion on the type of program desired. The annual convention will be held in Springfield, March 20 and 21.

John Glenn, president of the Illinois Locker Association and a member of the Locker Industry Advisory Board gave a report on locker controls now in effect.

The afternoon was well spent in discussion of new plans intended to increase sales and decrease cost of distribution, involving the use of vending machines, dealer systems for delivery, and other subjects.

Because of the varied types of weather and general economic conditions, the sales of ice in Illinois have varied from place to place. Due to the floods in the west, shipments of perishables have been in many cases diverted and ice plants on the new routes of diversion have benefitted temporarily. In other places there has been a lack of car icing for the same reason. Many plants are on a par with sales of 1950, others are below. Location and conditions usually govern. In the fruit belt in southern Illinois it is reported that they will have only from 5 to 10 percent of a normal crop of peaches which is really a tragedy for the growers and a condition that will seriously affect ice sales in that territory. The February freeze not only killed the crop but in many instances, the trees. Some shortages of labor are showing up and quality is not the best.

School Book Covers For Canadian Ice Men

NEW school book covers are being made available for use of Canadian ice men this fall by the Canadian Association of Ice Industries. The covers are made in durable heavy paper, reproduced in two printed colors, plus a manila covered background. The sheet is 11½x17 inches which allows for generous underlap for securing cover and will fit all standard text books. They are expected to be a popular advertising medium in local communities and with an exceptionally long life. They are particularly appropriate since in most Canadian schools covering text books is compulsory.

The front cover contains a space for name and address of the owner also the emblem of the Canadian Association of Ice Industries and a space for imprinting the ice company's name and address.

Help the Servicemen

SOME men are the friendly type and have no trouble getting along with most everyone. Others need a little encouragement. An idea that is worth consideration is to have the ice serviceman's name embroidered on his uniform shirt, first name only, like Jim, Jack, Dave, etc. It is human nature to want to call people by their first name, and this should be a natural for ice delivery service.—(Canadian Association of Ice Industries Bulletin.)

Canadian Association of Ice Industries

MILDRED E. CROFT, Secretary

THE Canadian Association of Ice Industries is conducting a survey to ascertain the ice tonnage in Canada for 1949 and 1950. This is the first time that a survey has been attempted by our Association and we are hopeful of conducting the survey yearly if there is sufficient interest on the part of the ice companies.

Domestic ice sales in Canada are down slightly from 1950 but total sales seem to be keeping up to the 1950 figures. The sale of ice refrigerators has slumped along with the sale of all home appliances partly due to increased Government restrictions on credit buying, but mainly due to the tightening of family economy.

Two Toronto companies will be taking display space at the Canadian National Exhibition again this year and will be displaying ice, ice refrigerators and ice using store equipment. The Canadian National Exhibition runs from August 24 to September 8 inclusive and the annual attendance is in excess of two million.

British Columbia members advise that they are enjoying excellent tonnage due to the fact that there have been 43 consecutive days without rain. This was an unprecedented weather situation in that section.

Ohio to Show Ice Booth at State Fair

THE Ohio Association of Ice Industries will again have an exhibit at the State Fair. It will be located, as usual, in the Columbus Building on the Fair grounds. An interesting and attractive exhibit built around the sweet corn icing project now being conducted by the Research Department of the Association is being planned. At this exhibit the Ohio ice industry will be putting its best foot forward before the thousands of people from all over the state who will be in attendance.

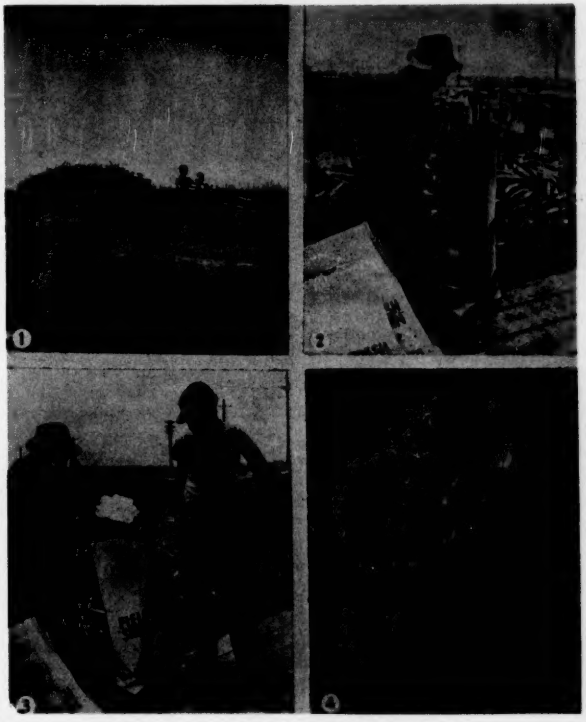
The benefits which accrue from the field icing of sweet corn will be brought frocibly to the attention of the visitors at the booth, particularly to those from the farm areas. Judging from recent quotations in the Columbus market, which showed "iced" sweet corn selling for 15 cents per dozen more than "uniced" corn, any farmer can afford to ice his sweet corn crop; in fact, he can't afford not to ice it.

Crushed Ice and a Good Container Keeps "Just Picked" Flavor of Sweet Corn

A COMPLETE package for harvesting and marketing his crops is now available to the sweet corn grower—the package consisting of a specially designed paper bag plus the necessary quantity of crushed ice. Besides the corn grower himself many fresh produce wholesalers and retailers, faced with the problem of sweet corn spoilage and resultant markdown losses, will be interested in this newest marketing wrinkle.

It has long been known that necessary adjuncts to retaining the "just picked" flavor of sweet corn until it gets to the customer's dinnertable is crushed ice and a proper container. The container problem is answered by a new bag developed by Union Bag & Paper Corp. in conjunction with various agricultural agencies and ice associations. Designed to hold four or five dozen ears of corn (depending on size) plus 20 pounds of ice, the bag is used by the grower immediately after the corn is harvested. This icing at the farm level keeps the sugar in the corn from turning to starch.

The bags, illustrated in the picture below, are made from three layers of wet strength kraft paper; a series of perforations in the bags act as drains for the melted ice water. As illustrated, no attempt has yet been made to mechanize the corn packaging and icing operations. This is due to the limited volume of these shipments. Once the volume warrants it, operations could be mechanized to reduce packaging costs.



How sweet corn is harvested, iced and packed. 1—The fresh picked corn is brought in from the field. 2—The corn is placed immediately in the bag in layers of a dozen ears each. 3—Four pounds of ice are put on top of each layer of corn to insure low temperature and keep sugar in corn from turning to starch. 4—The filled and iced bags are then wire-tied and ready for their trip to market.

Research Committee Reviews Current Projects at Meeting in Cincinnati

CORN icing, meat icing, ion exchange and ice use by florists were among the topics discussed when the NAII Research and Engineering Committee met July 23 in Cincinnati. Present were committee members L. L. Swartz, Indianapolis; J. C. Rear, San Francisco; William A. Schmid, Chicago; and D. J. Copeland, Richmond, Kentucky; and Guy W. Jacobs, Executive Secretary, and C. P. Austin, Director of Research and Engineering of NAII.

The committee heard reports on its current research projects and drew up proposals for next year's program. Present activities include the following studies at universities:

Corn Icing Study

Two-year study on ice-packaging of corn for shipment to local markets, at Ohio State University. Directed by Raymond C. Scott, assistant professor of agricultural economics, this project is now being completed. A similar one-year study in Illinois, under the direction of B. F. Hartline of the Illinois Deartment of Agriculture is being completed, and work on a similar project is being carried on in Indiana. These projects are all sponsored and being given financial assistance by the respective state ice associations.

A two-year study of hydro-cooling and layer-icing of corn at Purdue University under the supervision of J. S. Vandermark, assistant professor of horticulture is being completed this year.

A two-year study of ice display of meat at retail level, at the University of California; supervisor, Floyd D. Carroll, Department of Animal Husbandry, also in completion stage. This work is being sponsored jointly by the National Association of Ice Industries and the Union Ice Co. of California.

A two-year study of the ion exchange method of treating water for ice manufacture is just being started at the University of Texas under the direction of W. A. Cunningham, professor of engineering. Preparation of a manual on water treatment for use of operating engineers should be available by the end of the year. This work is being carried on with the cooperation of the Calcium Chloride association and the Industrial Pump Co. of Chicago.

It was decided that the following research activities would be proposed for the coming year: (1) Expansion of the agricultural program to include a wide selection of vegetable items: also exploration into the possibilities of using ice to improve the quality of commodities to be canned. (2) Expansion of hydro-cooling research with emphasis on cherries, peas, beans and similar commodities. (3) Additional research on vending station sale of ice to ascertain the best type of package for vendors and the uses for which people buy ice at the stations. (4) Study of ice for protection for prepackaged vegetables and meats. (5) Development of a new type of container for ice which would be available in case of bag shortage—one which would meet all local health regulations. (6) Study of ice for protection of flowers at retail florist shops. This was inspired by the success with which flowers were so protected in the NAII booth at the recent Home Economists' convention in Cleveland.

It was put on record at the meeting that a substantial part of the time and efforts of the Research Department must now be devoted to liaison with government agencies on the vital equipment of the Ice Industry. Though this results in some curtailment of the time which can be spent on research, current research activities are still being carried out under thorough supervision and with full efficiency.

Peoples Ice Purchases Syracuse Ice Companies

THE ice manufacturing and distribution business has been discontinued under Arctic Ice by the Central City Cold Storage Company, Sracuse, N. Y. Business will be serviced from the modernized and expanded People's plant at 1054 Oswego Blvd. Central City Cold Storage will use the Arctic ice space at 1001 Burnet Ave., for expansion of its cold storage facilities.

People's Ice, headed by Harrison D. Sanford as president, with P. J. Mastin as general manager, has increased and improved its production and processing facilities at the Oswego Blvd. plant and has established fifty service stations in and around Syracuse with refrigeration facilities for ice in block, crushed, or cube form. Announcing the business deal, the People's management said that costs brought about the change to a single system.

Are There Substitutes For Refrigeration?

IT MAY be reasonable to expect that technological and industrial effort will be devoted to finding ways and means of avoiding refrigeration of perishable commodities. Technical progress of that kind is useful because it is admittedly impossible for people to have refrigeration with them wherever they may wish or may be required to be.

Sometimes, however, comment runs to the extreme; for example, the recent one that "a new food processing method for shrimp" (which turns out to be not new but actually simply dehydration) "may eventually knock the props out from under many frozen products." One can readily find other examples of this sort of statement in the daily press and magazines. It seems to be a popular theme, especially where electronics are involved.

Regfrigeration and refrigerated warehousing have real value even for foods that are partially stabilized by removal of water or other treatment, particularly for long holding. Those values are often overlooked, simply from failure to seek positive values in refrigeration and because of primary technical interest in other supplementary aids to preservation of foods.

An editorial in the British Food Journal "Food" for May, 1951, advances the thesis that European agriculture and European prosperity in general require a large, integrated refrigeration industry that can store, transport, and distribute European products in a broadened and less hampered European market. Advantages pointed out are avoidance of market gluts, greater abundance, finer quality.

An international industry on the scale of our own would do much to stabilize that continent, thus the argument runs. And who can gainsay the reasoning when refrigeration, intelligently used, does so much to preserve the quality and nutritional properties of foods?—From Information Bulletin Published by The Refrigeration Research Foundation.

New Refrigerated Barges

THE Kelly Ryan Equipment Company of Blair, Neb. will build six refrigerated barges for the navy under a $1,272,000 contract awarded last month. Previously the company had been awarded a $160,000 contract for the construction of a 500 hp river tow boat. Some additional personnel will be needed to handle the work, officials said.

Frozen Foods
*Reg. U. S. Pat. Off.
PREPARATION PACKAGING FREEZING STORAGE DISTRIBUTION DESIGN CONSTRUCTION EQUIPMENT

Off-flavors in Unblanched Peas During Storage

IT IS well known that to secure high quality frozen peas it is necessary to blanch this vegetable before placing it in storage and that unblanched peas held in frozen storage develop undesirable off-flavors that are frequently described as "hay-like" in character. The present investigation was started with the object of determining the cause of these off-flavors.

Samples Analyzed

Analyses were made of the raw and blanched samples from the 1945 series following removal from storage in 1950, and from samples of the peas harvested in 1950 immediately after preparation. The results of the sugar and starch determinations indicate that little change took place in these fractions during the storage period. The data also indicate that no gross changes had occurred in the overall nitrogen content. Possible changes among the various nitrogenous components which might have taken place during storage of the unblanched peas, and which may have led to the presence of volatile amines, were investigated.

When lipids (the group of substances containing fats and other esters) become rancid either through hydrolytic or oxidative action, certain characteristic changes can be observed in the various fat "constants." Among the changes noted in oxidative rancidity are an increase in peroxide number and acid number and a decrease in the iodine number. The most reliable of these three criteria for the detection of oxidative rancidity is the increase in the peroxide number. The peroxide number showed a value of zero in the lipids from the 1950 crop of peas as compared to a value of 27.3 in the lipids from the stored unblanched peas of the 1945 crop. The lipid material from unblanched peas which had been stored at -17.8 C (0 F) for five years also gave evidence of rancidity in the other two tests, namely, a higher acid number and a lower iodine number than were found in the lipid material from the 1950 crop.

The residue remaining after ether extraction of the unblanched peas of the 1945 crop was found to have a flavor that was suggestive of cereal, with a slight flavor of pea. Rancid flavor was completely lacking when it was tasted dry, or after it had been cooked with water. The taste of the extracted lipid material from these unblanched peas stored for five years at -17.8 C (0 F) was decidedly rancid. The odor, too, of this lipid material was typically that of a rancid fat, all of which corroborated the results of the chemical analyses, i. e. high peroxide number, lower iodine number, and high acid number. On the other hand, the lipid extracted from the blanched peas stored for five years at -17.8 C (0 F) showed no taint of rancidity. The extracts prepared from blanched and unblanched peas of the 1950 crop immediately after harvest likewise showed no evidence of rancidity. These findings show that rancidity in the lipid fraction is a dominant factor in the development of off-flavor in frozen unblanched peas.

It has been observed on numerous occasions that unblanched vegetables show deterioration in color during storage at -17.8 C (0 F). It was already known that the carotene content of certain unblanched vegetables including peas decreases during storage at this temperature. An investigation was made of the content of chlorophyll and beta carotene in blanched and unblanched peas of the 1945 crop after five years of storage at -17.8 C (0 F) and of similar samples from the 1950 crop analyzed immediately after harvest.

Discussion

The results presented in this paper show that rancidity of the lipid material is one of the primary, if not the principal cause of the development of off-flavor in unblanched peas stored at -17.8 C (0 F). This conclusion was reached as a result of the following information. The peroxide number of the crude lipid matter extracted from the unblanched peas after storage for five years at -17.8 C was high and the acid number was high also. Contrasted with this was the almost negative peroxide number found for the crude lipid extracted from the blanched peas of the same original lot, stored under the same conditions.

The acid number of the lipid matter obtained from the blanched peas was about one-fifth of that of the lipid matter obtained from the unblanched material. Further, the iodine number of the lipid matter obtained from the unblanched peas was lower than that of the crude lipid matter from the blanched peas; such a reduction in iodine number is another criterion of rancidity.

Tests made on the crude lipid matter, prepared from blanched and unblanched peas of the 1950 season of the same variety (Thomas Laxton) and run immediately after harvesting and processing showed negative peroxide numbers on both blanched and unblanched lots. The iodine numbers of the crude lipid material from blanched and unblanched peas of the 1950 crop were essentially equal, and the same was true for the acid numbers of the respective lipid fractions. These lipids extracted from the peas of the 1950 crop showed no signs of the rancidity which characterized the lipid fraction of the unblanched peas after five years of storage. This indicates that the blanched samples underwent no deterioration in the lipid fraction during five years of storage at -17.8 C.

Summary

Blanched and unblanched Thomas Laxton peas were dried after five years of storage at -17.8 C (0 F), and the lipid material was extracted with peroxide-free anhydrous ethyl ether. Similar ether extracts were prepared from blanched and unblanched fresh peas of the same variety immediately after harvest.

From report published in Foods Research, by Frank A. Lee and A. C. Wagenknecht, New York Agricultural Experiment Station, Cornell University, Geneva, N. Y.

Experimental results based on peroxide number, iodine number, and acid number, as well as on taste and odor, have shown that rancidity of the lipid material is one of the primary causes, if not the principal cause of the development of off-flavor in unblanched frozen peas during storage at −17.8 C (0 F).

No changes of significance were observed in the reducing and nonreducing sugar fractions and in the starch fraction. Thus it appears that these components of the carbohydrate fraction do not contribute to the development of off-flavor during the storage of frozen unblanched peas. No changes were observed in total nitrogen content, such as would have occurred had ammonia or volatile amines or other volatile nitrogenous compounds been evolved during storage. There was a considerable loss of chlorophyll and carotene during the protracted storage of frozen unblanched peas.

Profits on Frozen Foods Higher than Canned

PROCESSORS' profits on a typical annual pack of frozen fruits and vegetables generally showed a higher and more consistent return than did profits to canners, according to a study conducted by the U. S. Department of Agriculture.

The study on processing costs is the first such comprehensive study undertaken by the government. It covered a representative group of canners and freezers during the 1949 season. Commodities covered were frozen peaches, strawberries, baby lima beans and green peas, and canned peaches, pears, green beans, sweet corn, peas and tomatoes. C. W. Peters, former economist with the Bureau of Agricultural Economics, who conducted the survey drew these conclusions:

"Processors' profits realized on the 1949 pack of the 11 commodities included in this project made up from minus 4 to plus 9 per cent of retail value, with the frozen commodities generally showing a higher and more consistent return.

"Among the canned products, both cling peaches and sweet corn showed a net loss to the canners during the 1949-50 marketing season. The remaining five canned products returned a profit ranging from 1.5 percent of the retail price on tomatoes to 6 percent on green beans. For the frozen fruits and vegetables, the processor's profit represented from 5 to 9 per cent of the retail price."

COSTS OF PROCESSING FROZEN FRUITS AND VEGETABLES (PERCENT)

	Peaches	Strawberries	Baby Limas	Peas
Raw Produce	12	43	33	32
Supplies	27	16	7	12
Direct Labor	18	7	11	8
Indirect Operating	16	9	22	20
Warehousing and Shipping	9	4	4	7
Selling and Administration	10	10	9	11
Gross profit	8	11	14	10

Specifically, the study shows the processor's gross profit on frozen peaches was 5 percent of the retail price; frozen strawberries, 7.6 percent; baby limas, 8.9 percent and peas, 6.3 percent.

"The raw product is generally the largest single item of cost in packing frozen fruits and vegetables," Mr. Peters reported. "Costs of the raw produce varied from 12 to 43 percent of the sales value, fob plant, on peaches, strawberries, lima beans and peas. During the 1949 season, the price of peaches was unusually low. Supplies used in packing the two fruits cost more than those used in packing the vegetables, largely because of the sugar used in preparing the fruits.

"The heavier investment in equipment required to process vegetables is a major reason for the higher percentages which indirect operating costs represent in the sales value of those products. Gross profit in 1949 varied from eight percent on peaches to about fourteen percent on lima beans."

The table summarizes the findings on various costs of processing frozen fruits and vegetables, expressed as a percentage of sales value fob plant in 1949:

Frozen Asparagus Pack Shows Increase – Institutional Sizes Gain

FROZEN Asparagus production this year was 23,186,981 pounds, according to a preliminary compilation by the National Association of Frozen Food Packers. The 1951 total was approximately four percent larger than the pack last year, and greater than in any other preceding year except 1946. A regional breakdown shows smaller production than last year in the West and Midwest but appreciably larger production in the East and South.

Container-size usage in 1951 showed a definite change from last year. The pack in the small institutional size of 2½ pounds was significantly larger this year than in 1950, while the total pack in retail sizes of less than 1 pound (10 oz. & 12 oz.) was smaller than last year.

Another shift in container-size usage was the sharply increased pack in the 10 oz. retail size and the precipitous reduction in pack of 12 oz. retail size. The attached table shows data for the pack in 1951 and for earlier years, broken down by region and by size of container.

TOTAL UNITED STATES ASPARAGUS PACK

Year	Pounds
1942	5,769,452
1943	9,619,255
1944	12,339,171
1945	20,637,590
1946	28,316,074
1947	10,737,171
1948	18,321,209

ASPARAGUS PACK OF RECENT YEARS BY REGION

Region	1949 Pounds	1950 Pounds	Preliminary 1951 Pounds
East and South	8,009,676	8,634,382	10,751,562
Midwest	649,226	784,412	603,207
West	9,763,338	12,890,405	11,832,212
Total	18,422,240	22,309,199	23,186,981

ASPARAGUS PACK OF RECENT YEARS BY SIZE OF CONTAINER

Size	1949 Pounds	1950 Pounds	Preliminary 1951 Pounds
10 ounce	41,346	2,695,940	8,344,109
12 ounce	13,361,873	13,825,422	6,331,522
2½ pounds	4,869,000	5,447,864	8,101,403
4 and 5 pounds	65,545	157,864	278,622
Other small sizes (Under 10 lbs.)	68,832	148,944	131,325
Misc. large sizes (10 lbs. & over)	15,644	33,165	
Total	18,422,240	22,309,199	23,186,981

Regulation of Frozen Food Prices Due

THE frozen food pricing regulation is now reported to have cleared the Fruit & Vegetable Branch and to be moving forward for signatures at higher levels of OPS according to a bulletin of the National Association of Frozen Food Packers. The objective was to push the regulation through before enactment of new legislation on price control authority. Various reasons have been advanced for the delay, most of them involving difficulties in gaining legal approval.

The industry's insistence on prompt action by OPS has started the regulation moving forward again, but OPS officials will not predict just when issuance of the regulation can be expected. It is by no means certain that all opposition to this regulation has been overcome. Another factor adding to the uncertainty is that the basic law providing authority for pricing regulations has now been amended through enactment of the Defense Production Amendments of 1951 (S.117). It is not known if the frozen food pricing regulation complies with the amended law.

Amendments to the Defense Production Act which were enacted into law this week are believed to require liberalizing of pricing policies by OPS. The new law prohibits the establishing of a ceiling price which is below the lower of the following prices:

(1) The price existing just before the date of issuance of the new regulation, or

(2) The price prevailing during the period January 25, 1951 to February 24, 1951.

An exception to the above is that price rollbacks are permitted if the new ceiling price

(1) is based on the highest price received between January 1, 1950 and June 24, 1950 and reflects changes in all costs occurring prior to July 26, 1951, or

(2) is established under regulations issued prior to enactment of the new law (July 31, 1951).

"Costs" are defined to include "material, indirect and direct labor, factory, selling, advertising, office and all other production, distribution, transportation and administration costs, except such as the President may determine to be unreasonable, and excessive." Because of this broad definition of costs and the fact that such costs generally were advancing from June 24, 1950 to July 26, 1951, it is generally believed that the exception to the prohibition against rollbacks may not be very significant, and that there may be more roll forwards than rollbacks.

Locker Plant Rentals And Processing Rates

THE charges made by frozen food locker plant operators for locker rentals and for cutting, wrapping, freezing and curing services have shown a steady rise along with increased costs for labor and materials, a government survey indicates.

The Farm Credit Administration, in a detailed study of locker plant operations by L. B. Mann and Paul Wilkins, covering conditions prevailing in 1950, suggests that an increase in the number of home deep freeze units has tended to cut into the locker business, both on rentals and on processing.

A total of 11,600 locker plants was in operation at the time of the survey, with space for 5,700,000 lockers. Rentals varied all the way from $3.39 per cubic foot in Florida and $3.14 in Arizona and Nevada, to $1.11 a cubic foot in the state of Washington and $1.28 per cubic foot in Oregon. The U. S. average locker rental charge figured out to about $12.97 per year, and ranged from $9.34 per locker in Washington to $20.16 in Arizona.

Typical average annual locker rental charges included the following: Florida, $19.74; Texas, $14.38; Washington, $9.34; Rhode Island, $17.25; Kansas, $12.04; Kentucky, $14.49; California, $15.28; Montana, $12.41; Maryland, $14.63, and Minnesota, $11.58.

The survey indicates that, in general, locker plants these days offer a wide variety of diversified services. Most plants offer chilling, aging, cutting, grinding, wrapping and sharp-freezing services. Many of them also provide such services as slaughtering, poultry dressing, curing, smoking, lard rendering, and fruit and vegetable processing. A smaller number also manufacture commercial type sausage and ice cream and have embarked on a wholesale and retail merchandising program.

Almost 90 percent of the 6,737 plants that responded to the F.C.A. survey reported they offer chilling, cutting, wrapping and freezing services. Some 57 percent of the plants cure pork, and about the same number smoke pork, hams and sausage. Forty-nine percent of all reporting plants offer some type of slaughtering service.

"In addition to what might be termed service operations," the study said, "an increasing number of locker plants have expanded their activities into commercial operations. The survey showed that 17 percent of all locker plants custom-slaughtered poultry for non-locker patrons, and

15 percent of them killed and processed poultry for re-sale. Plants providing the highest percentage of custom slaughtering of poultry were located in the South Atlantic and South Central regions, with those reporting the lowest percentage in the Pacific region."

Fifty-one percent of all plants sell commercial frozen foods; 43 percent wholesale beef and pork processed by packers; 27 percent report the manufacture and sale of pork sausage.

Increase in Frozen Food Shipments Is Expected

SHIPMENTS of frozen foods and frozen citrus juices by railroads in the third quarter of this year are expected to show an increase of 7.9 per cent over the corresponding quarter of 1950. That forecast has been made by the Regional Shippers Advisory Boards, reporting to the Association of American Railroads. The forecast is used to determine freight car and refrigerator car requirements for the various railroad lines.

Largest expected increase in frozen food shipments in the third quarter is projected for the southeastern states, where a 60 percent rise in carloadings is anticipated. That reflects the boom in the frozen citrus concentrate industry, with resultant large movement by rail from Florida concentrating plants. The A.A.R. reported that a total of 5,686 carloads of frozen foods, fruits and vegetables likely will be moved in the quarter ending September 30. That would compare with loadings of 5,269 cars in the third quarter of last year.

Temperature-Tolerance Studies for Frozen Foods

A PRELIMINARY report on the temperature-tolerance studies for frozen foods under way at the U. S. Department of Agriculture Western Regional Laboratory has been issued. It is of special interest because it suggests a considerable range in storage life of a specific frozen fruit, due to variations in production and packaging. Several fruits have undergone preliminary testing at varied temperatures and extensive elaboration of the studies will follow completion of construction of facilities. The subject is financed under the Research and Marketing Act and aided by The Refrigeration Research Foundation as Project No. 32.

Frozen Foods

Frozen Food Lockers Asset to Food Resources

THE frozen food locker industry is in a position to render valuable service in an emergency because of the wide distribution of its processing facilities and storage stocks, according to two reports announced by the U. S. Department of Agriculture.

The reports, prepared by the Farm Credit Administration, also state that frozen food locker plants can be useful in minimizing demand on overburdened transportation facilities, in saving critical packaging materials such as tin and aluminum, in utilizing available small town labor, in holding down excessive distribution costs, and in conserving and storing home-grown perishable foods for local distribution and consumption.

The authors are L. B. Mann and Paul C. Wilkins of Farm Credit Administration's Cooperative Research and Service Division. The reports are M.R. 146, "Frozen Food Locker Plants—Location, Capacity, Rates and Use, January 1, 1950", and M.R. 148, "Frozen Food Locker Cooperatives in Illinois, 1949." The former is a Research and Marketing Act project, conducted in cooperation with the Bureau of Agricultural Economics.

Serve 3.9 Million Patrons

The 11,442 frozen food locker plants in the United States on January 1, 1950, were serving 3.9 million locker patrons and about 440 thousand home unit owners not renting lockers, a total of over 16 million persons. Locker plants have continued to expand and diversify their services along the lines of slaughtering, curing, smoking, poultry dressing, and merchandising.

The 35 cooperatives studied in Illinois operate 93 locker plants. Semi-commercial processing and selling operations continued to account for a larger proportion of the association's receipts than in previous years. Total receipts increased from 54 percent over six years ago with rentals accounting for 15 percent of this increase, processing 48 percent, and other receipts, principally sales, 37 percent.

The findings of these studies, say the authors, indicate the need for using labor and facilities more efficiently, increasing volume, making more efficient use of byproducts, giving closer attention to details, analyzing internal costs, improving processing methods, expanding services, evening out seasonal processing volume, and carrying on a more aggressive and intelligent merchandising program.

Shipping Frozen Foods By Rail and Truck

SHIPPING frozen foods by rail and truck was discussed by Harold Emerson of the Cumberland Warehouse Corp., Bridgeton, N. J., at a meeting of the Institute of Food Technologists in New York last June.

Tracing the remarkable growth of the quick frozen food industry, Mr. Emerson stated that in his opinion the industry's rise equalled that of the automobile, radio and television industries. Transportation, he said, is the key to the frozen food situation. No matter how carefully produced or expertly handled the product may be, if it is not transported properly to its ultimate destination, a marked lowering of quality results.

He considered the relative merits of rail, truck, air and water, the four transportation methods. Truck and rail transport far outdistance the other means, from a practical standpoint, according to the speaker. Much progress has been made in refrigerated shipping by rail, he pointed out. The development of the mechanically refrigerated car, he hailed as significant. It has two considerable advantages over the bunker method. The principal one is that proper refrigeration is more easily possible through use of the mechanical unit. The second is that valuable time is saved by the mechanical refrigerator car since it does not have to be shunted about to icing points as the bunker cars do.

Truck transport, he regards as generally satisfactory. Nearly all of the equipment now in use for frozen food transport has been constructed to meet scientific storage requirements. A uniformity in road-weight laws is one badly needed improvement in truck transport. Rail costs have risen sharply since World War II. Truck rates have also increased but not to an equal extent. In some instances, therefore, truck transport is cheaper than rail shipment of frozen product at this time.

He closed his remarks by issuing a challenge to the food technologists to aid in promotion of the growth of the frozen food industry by developing "a more compact, lightweight, practical, moisture-vapor proof container" plus "a strong outer case with like specifications to hold a given number of individual packages."

Tax Amortizations for Ammonia Concerns

CERTIFICATES of necessity for accelerated tax amortization on new defense facilities have been issued by the Defense Production Administration to the following manufacturers for anhydrous ammonia facilities.

Commercial Solvents Corp., Sterlington, La. Applied for $20,537,000 of which 50 percent was certified.

Spencer Chemical Co., Vicksburg, Miss. Applied for $13,958,000 of which 50 percent was certified.

Mathieson Chemical Corp., Lake Charles, La. Applied for $2,266,891 of which 50 percent was certified.

Hooker Electro-chemical Co., Tacoma, Wash. Applied for $1,894,700 of which 50 percent was certified.

Wyandotte Chemical Corp., Wyandotte, Mich. Applied for $2,624,000 of which 50 percent was certified.

Diamond Alkali Co., Houston, Tex. Applied for $1,606,000 of which 50 percent was certified.

Diamond Alkali Co., Painesville, Ohio. Applied for $828,900 of which 70 percent was certified.

Dow Chemical Co., Freeport, Tex. Applied for $4,316,800 of which 50 percent was certified.

Shell Chemical Corp., Dominguez, Calif. Applied for $7,600,000 of which 50 percent was certified.

Tax Amortizations Issued For Refrigerator Cars

ADDITIONAL certificates of necessity for accelerated tax amortization on new defense facilities have been issued by the Defense Production Administration to the following:

Fruit Growers Express Co., Washington, D. C., refrigerator cars. Applied for, $2,877,951 of which 80 percent was certified.

Pacific Fruit Express Co., San Francisco, Calif., refrigerator cars. Applied for, $18,634,960 of which 80 percent was certified.

Laramie Icing Plant Nears Completion

INSTALLATION of refrigeration equipment at the new $1,500,000 Pacific Fruit Express company icing plant at Laramie, Wyo. is ready to get under way. Construction of the plant is about 75 percent complete. Actual production of ice is scheduled to start November 1. An illustrated description of this ice plant was published in the April 1951 issue of ICE AND REFRIGERATION.

Records Chart Business

(Continued from page 20)

in additional running expense without having the use of a beautiful new piece of equipment with its added advertising value and prestige.

It is not possible to consider individually all the forms that can be used in the ice industry but to emphasize the importance of keeping adequate records so that comparisons may be made, weaknesses revealed, expenses controlled, leaks eliminated and new business created through careful planning based upon the experience of the past.

All-Industry Exposition

OVER 200 of the leading manufacturers of refrigeration and air conditioning equipment will display their latest and most modern equipment at the 7th All-Industry Refrigeration and Air Conditioning Exposition which will be held at Navy Pier, Chicago, from November 5 to 8, 1951.

The Exposition is sponsored by the Refrigeration Equipment Manufacturers Association of Washington, D. C., and is a national trade show with free administration, by registration, to anyone identified in anyway with the refrigeration or air conditioning industry.

L. C. McKesson, Chairman of the Exposition Committee, announces that "this year's show will be the world's largest display of refrigeration and air conditioning units, equipment, and parts ever assembled under one roof." The entire north section of Navy Pier, comprising over three full acres of floor space, will be used to house the exhibits valued at over five million dollars.

New Developments

In the two years since the last Exposition was held at Atlantic City there have been many new developments and a steady growth in the science and use of refrigeration and air conditioning. Practically all the food we use comes into contact with the preservative qualities of refrigeration somewhere along the line and with the advent and increasing use of frozen foods, the refrigeration industry has become one of the fastest growing and largest industries in the country.

There is also ample proof that air conditioning, as an industry, is now in an era of expansion comparable to such post-war industries as television and electronics. Far from being an expense, astute business men now realize that air conditioning is in reality a business-getter and a profit-maker.

This continual growth in the size and importance of the industry accounts for the increase in interest and number of exhibitors and also for the increasing attendance which is expected to reach the 15,000 figure this year.

"Manufacturers, wholesalers, retailers, service engineers, contractors, architects, consulting engineers, and national and chain-store buyers attending from all parts of the country, Canada, and many foreign countries will see, on display, all of the latest offerings of the industry ranging in size from tiny quarter-inch fittings to 20-ton air conditioning units," Mr. McKesson said.

The Exposition will be open to visitors during the following hours: Monday, November 5, 2 p. m. to 10 p. m.; Tuesday, November 6, 10 a. m. to 6 p. m.; Wednesday, November 7, 12 noon to 10 p. m.; Thursday, November 8, 10 a. m. to 4 p. m.

1951 Research Grants Awarded by A.S.R.E.

THE American Society of Refrigerating Engineers through its Research Committee under the chairmanship of C. M. Ashley, Carrier Corporation, has recently authorized grants to a number of colleges for the furtherance of research on subjects pertaining to refrigeration.

These grants were made under the policy whereby the A. S. R. E. sponsors wholly or in part a number of research projects each year. Although the Research Committee recommends the subject, and progress reports are submitted semi-annually before each Convention, the colleges are given a completely free hand in regard to the manner in which they conduct the work.

At the present time, there is a total of eighteen active research projects being conducted under the sponsorship of A. S. R. E. Naturally, it is hoped that all will be brought to a successful conclusion, and provide results which will benefit the refrigeration industry.

Among those colleges participating are Oklahoma A & M, Case Institute of Technology, and St. Louis University. At Oklahoma A & M, under the direction of Dr. L. H. Bartlett, the problem of "Refrigerant Desiccants" will be studied to determine the equilibrium distribution of water between liquid refrigerants and desiccants. This investigation was initiated at the joint request of the Standards Committee and the Research Committee as a result of a controversial paper on desiccants presented at an A. S. R. E. Convention a few years ago. The controversy revolved about the nature of desiccants, their functions, and the nature of the mechanical or chemical processes involved in the drying operation. The project was started at Louisiana State University under the direction of Dr. Bartlett with some excellent results to date, but it was felt preferable to transfer the work when he moved to his new position at Oklahoma A & M.

At Case Institute the subject is "Heat Transfer Coefficients Boiling in a Horizontal Tube Evaporator." This is a continuation of two previous projects which were supported in part by A. S. R. E., and it is hoped by further experimentation to determine a method for designing direct expansion evaporators based on fundamental design data. Prof. W. L. Bryan of Case Institute hopes that continued effort will lead to a quantitative and qualitative understanding of the direct expansion evaporator.

St. Louis University, under Father B. J. Luyet, will study the "Preservation of Frozen Plant Tissues in the Living State" and North Carolina State College under Prof. K. O. Beatty will study "Sensible vs. Latent Heat Transfer during Cooling of Humid Air."

In addition, the grant to the University of Kentucky was increased so that they could continue work on "The Deterioration of Meat under Various Storage Conditions."

Ice Company Liquidates

THE Albert Lea Ice & Fuel Co., Albert Lea, Minn., has disposed of its stock of natural ice and has liquidated. The last ice came from the 1949-50 harvest, since there was no harvest last winter on Fountain Lake for the first time in memory. The company had announced earlier that it would end ice harvesting and distributing activities when the present supply was exhausted.

Women Inspect Warehouse

THE Little Rock Cold Storage Company, Little Rock, Ark., was host recently to a group of women from the Women's Chamber of Commerce. The tour was a big success, it is reported. The women were very much impressed with the inside story of the refrigerated warehouse's part in protecting the country's perishable food supply. The tour was conducted by Merthyne Rogers, manager of the warehouse.

CONVENTION CALENDAR

FLORIDA ICE ASSOCIATION

October 15-16, 1951
Sheraton Plaza, Daytona Beach.
MURIEL WASHBURN, Secretary

NATIONAL ASS'N. PRACTICAL REFRIGERATING ENGINEERS

November 6-9, 1951
Peabody Hotel, Memphis, Tenn.
EMERSON BRANDT, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES

November 13-16, 1951
Shamrock Hotel, Houston, Tex.
GUY W. JACOBS, Exec.-Secy.

CANADIAN ASSOCIATION OF ICE INDUSTRIES

November 22-24, 1951
Royal York Hotel, Toronto, Can.
MILDRED CROFT, Secretary

DELTA STATES ICE ASSOCIATION

December 3-5, 1951
Buena Vista Hotel, Biloxi, Miss.
R. N. MILLING, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES

March 31-April 8, 1952
French Lick Springs Hotel.
ROBT. W. WALTON, Secretary

MISSOURI VALLEY ICE MANUFACTURERS ASSOCIATION

January 7-9, 1952
Hotel President, Kansas City, Mo.
V. A. ESPHORST, Secy.-Treas.

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES

January 20-22, 1952
Burlingame Hotel, Bartlesville, Okla.
HARRY T. HUDSON, Exec. Secy.

MICHIGAN ICE INDUSTRIES ASSOCIATION

February 12-13, 1952
Hotel, Detroit, Mich.
EDWARD W. JACKSON, Secy.

OHIO ASSOCIATION OF ICE INDUSTRIES

February 25-26, 1952
Deshler Wallick, Columbus, Ohio
ELIZABETH SHANNON, Secretary

SOUTHWESTERN ICE MANUFACTURERS' ASSN.

March 12-14, 1952
Hotel Texas, Fort Worth, Texas
P. A. WEATHERRED, Secy-Counsel

NORTHWEST ASSOCIATION OF ICE INDUSTRIES

March 26-28, 1952
Yakima Hotel, Yakima, Wash.
L. F. MARSH, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES

March 31-April 3, 1952
ROBT. W. WALTON, Secretary
French Lick Springs Hotel

A.C.R.M.A. Product Sections Elect Officers

THE various product sections of the Air Conditioning and Refrigerating Machinery Association elected officers for 1951-52 in recent meetings, as follows:

Room Air Conditioner Section Chairman, M. T. Bard, Airtemp Division, Chrysler Corp.; Vice Chairman, H. L. Laube, Remington Corp.; Engineering Committee Chairman, W. L. McGrath, Carrier Corp.

Self-Contained Air Conditioner Section Chairman, T. E. Smith, Westinghouse Electric Corp.; Vice Chairman, W. G. Cox, General Electric Co.; Engineering Committee Chairman, R. E. Holmes, Worthington Pump and Machinery Corp.

Small Compressor and Condensing Unit Section Chairman, C. E. Ploeger, Servel, Inc.; Vice Chairman, F. E. Lehman, Frigidaire Division, General Motors Corp.; Engineering Committee Chairman, W. L. Knaus, General Electric Co.

Central Station Air Conditioning and Refrigeration Equipment Section Chairman, O. E. Gammill, Jr., Carrier Corp.; Vice Chairman, J. R. Hertzler, York Corp.; Engineering Committee Chairman, A. J. Mallinckrodt, Baker Refrigeration Corp.

Large Compressor and Condensing Unit Section Chairman, F. W. Smith, Baker Refrigeration Corp.; Vice Chairman, W. H. Aubrey, Frick Co. Inc.; Engineering Committee Chairman, E. B. Dunphy, Acme Industries, Inc.

ASSOCIATION DIRECTORY

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

NATIONAL ASSOCIATION OF ICE INDUSTRIES
Guy W. Jacobs, Secy., 1706 L St., N. W., Washington 6, D. C.

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres. Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
Emerson A. Brandt, Secretary 435 N. Waller Ave., Chicago 44, Ill.

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
Jack L. Dawson, Secretary
461 Market St., San Francisco, Calif.

CANADIAN ASSOCIATION OF ICE INDUSTRIES
Mrs. Mildred E. Croft, Secretary
317 Eglinton Ave., Toronto, Canada

DELTA STATES ICE ASSOCIATION
R. N. Milling, Secretary
Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
Samuel Freer, Secy-Treas.
1044 Drexel Ave., Drexel Hill, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary
1926 Silver St., Jacksonville, Fla.

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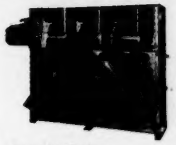

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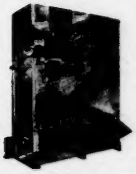

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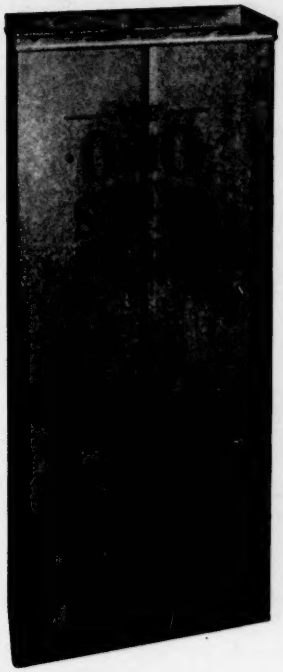

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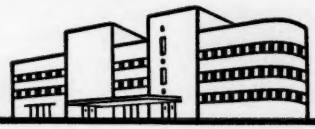
NEW PLANTS and  IMPROVEMENTS

This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

Alaska

Ketchikan, Alaska—E. C. Phillips & Son have opened a cold storage plant here which has a capacity of 750,000 lbs. of fish.

California

Parlier, Calif.—The United Packing Company recently placed in operation a $150,000 precooling and cold storage plant here. A 200 horsepower refrigeration machine has been installed. The plant is equipped with a duct system for distribution of cooled air.

Turlock, Calif. — Marshall Albee, owner of warehouses in Riverbank and Ripon, has announced the location here of a commercial freezing and cold storage plant, initial unit of which will cost $250,000. Eventual cost of the plant is expected to exceed $1,000,000.

Colorado

Denver, Colo.—The Maddox Ice Company has installed two new S & S ice vending stations. The new units are now in operation selling both block and bagged ice.

Florida

Tallahassee, Fla.—The Middle Florida Ice Company is now operating a new S & S ice vending station.

Indiana

Terre Haute, Ind.—The Vigo Ice & Cold Storage Company has installed an ice crusher-blower to provide truck icing service for loads of perishables. The machine is capable of producing two tons of crushed ice in approximately fifteen to twenty minutes.

Vincennes, Ind.—The Ebner Ice & Cold Storage Company has installed five S & S ice vending machines.

Louisiana

Shreveport, La.—The Independent Ice Co. has installed a new Frick booster compressor for its frozen food storage and locker plant.

Maryland

Baltimore, Md.—To provide additional military storage facilities, the Merchants Terminal Corp., has been granted certificate of necessity for accelerated tax amortization by the Defense Production Administration. The company applied for $2,250,000 of which 65 percent was certified for quick amortization.

New Jersey

Jersey City, N. J.—The Hudson Refrigerating Co., applied for $726,-325 tax amortization and has been granted a certificate of necessity certifying 65 percent.

Oklahoma

Henryetta, Okla.—The Shepard-Pierce Packing company recently opened a new plant on the site of the old Pierce Packing plant.

Washington

Grandview, Wash.—Installation of increased production facilities in the newly acquired plants here and at Mount Vernon are being made by Cedergreen Frozen Pack Corp. of Bellingham. The purchase of these two plants from Polar Frosted Foods Co. was announced in the May issue of ICE AND REFRIGERATION.

Klickitat, Wash.—Installation of a new unit to produce dry ice has been completed at the Gas-Ice Plant, near here, it has been announced by Jack Newbern, manager.

Seattle, Wash.—The Ranier Ice & Cold Storage Co. at 6004 Airport Way, one of the pioneer ice establishments of the city, plans early remodeling that will include alterations and improvements to the brewhouse and has another project that will call for the outlay of over $25,000 in order to construct cold storage rooms in its plant in the Georgetown section. This work will include installation of machinery as well as insulation and bricking up of wall apertures.

Seattle, Wash. — A new $50,000 market building is to be built at the Southwest corner of Empire Way and Myrtle Street, for Tradewell Stores, an independent chain of supermarkets located here. This new project recently launched will have complete refrigeration facilities for meats, a dairy product section and produce.

Wisconsin

Sturgeon Bay, Wis.—A new fruit processing plant here has begun operation. Reynolds Bros., estimate that their new unit will increase cherry freezing and canning capacity by more than 25 percent.

Fond du Lac, Wis.—A two story and basement cold storage plant at the County hospital is nearing completion at a cost of approximately $91,000.

Fires and Accidents

Covington, Ky. — The Bluegrass Provision Co., 309 W. 12th St. was damaged by fire recently.

Sales and Reorganizations

San Jacinto, Calif.—Purchase of the local ice plant from Alan Woolfolk and change of name to Twin Cities Ice Co. has been announced by Jack Haslam. Sale includes the ice manufacturing and storage plant on West Fifth Street. He will serve both Hemet and San Jacinto business houses and homes.

Ukiah, Calif.—George Butt has purchased the Ukiah Ice and Soda plant on Clara Ave. from Macy Leak of Willits. Butt expects to modernize service at the plant and to produce cubed ice for private and commercial use. Also available at his new business is warehouse and cold storage space.

Covington, Ky.—Fred D. Barlett bought property at 830 Clark Street, West End, and plans to conduct an ice and fuel business.

Jefferson City, Mo.—The Dunklin street ice plant has changed owners in a transaction involving about $90,-000. J. F. Odam, who has been manager of the plant for the past 18 years, announced he had bought majority control from the Capital Products Company. A new corporation, the City Ice and Cold Storage Company has been formed, and will be headed by Odam.

South Portsmouth, Ohio—Morgan Collier and his son-in-law Mayo Forbes have sold their ice plant to Estil Proctor, who will also operate a coal business.

Reading, Pa.—The sale of Barbey's Inc., Brewery, West Elm and Gordon Sts., to the Henry F. Ortlieb Brewing Company of Philadelphia was recently announced. The Ortlieb company plans an extensive expansion program for the Reading brewery.

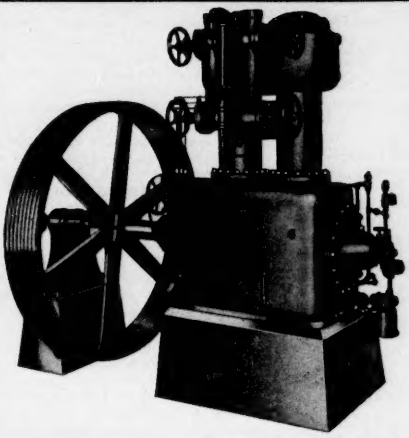
San Juan, Puerto Rico—The plant and business of San Juan Cold Storage Inc. has been sold to Swift & Company.

Seattle, Wash.—The R. D. Bodle Co., pioneers in processing and freezing of fruits and vegetables, has been purchased for approximately a million dollars by Clinton Foods, but will retain present management and process future food packs under the Snow Crop label for the Snow Crop Marketeers, a subsidiary of the Clinton organization. Ben F. Logan continues as general manager of the Bodle unit of the Clinton corporation.

New Incorporations

Kings, N. Y.—Articles of incorporation have been filed for Losquadro Ice Company Inc., to operate and maintain ice houses, cold storage and refrigerating plants. Capital stock was listed at 200 shares no par value. Directors are Frederick Farran, William R. Badger and William A. Hamlin, 120 Broadway, New York City.

Sterling



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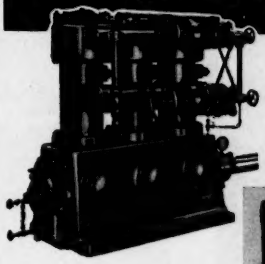

Below—Piston assembly and suction valve cage.

Left—Connecting rod, bearing, and piston pin.

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DEATHS

Albert L. Ewing

LONG prominent in the ice industry of Seattle and of the Pacific Northwest region, Albert LeRoy Ewing, former assistant treasurer of the Seattle Ice Delivery Co., died July 18 in a Seattle hospital.

Albert L. Ewing

Mr. Ewing left his birthplace, Monica, Ill., with his family when a boy and moved to Newport, Ore., in 1889. He came to Seattle in 1902. In 1903 he was employed by the old Seattle Ice Co. and in 1907, when the firm merged with the old Pacific Ice Co., he became office manager. When Pacific Ice and several other firms merged and became the Ice Delivery Company in 1913, he was named assistant treasurer and office manager. He retired in 1949.

He was past president of the Northwest Association of Ice Industries, the Northwest Cactus Succulent Society, and a member of the Seattle Poetry Club.

Surviving are his widow, Mrs. Anna Ewing, three sons, Albert, Herbert and Mark L., and two daughters, Mrs. Marion Bartholomew and Mrs. Kathleen Nordberg.

FOREST G. PATRICK, warehouse superintendent of the Southland Corp., Dallas, Tex., died recently at the age of 50 years. Formerly he operated an ice business in Overton, Tex. He is survived by his widow and two sons, M. G. Patrick of Dallas, and Sgt. Gene E. Patrick of the U. S. Army in Korea.

WALTER LEE, superintendent of the Blumenfield Ice & Coal Co., Memphis, Tenn., died at Baptist Hospital, Memphis, July 20. Mr. Lee had been associated with the ice company for 30 years. He was 71 years old. He was born in Mississippi and had been a Memphis resident for about 50 years. He leaves his widow, Mrs. Virgie Robinette Lee and a son Edward A. Lee of Jackson, Tenn.

Lindsay A. Nickell, Jr.

THE death of Lindsay A. Nickell, Jr. secretary and treasurer of the Columbis Ice & Storage Co., and the Fulton Ice & Storage Co., Columbia, Mo., occurred August 6 at Barnes Hospital in St. Louis after an illness of six weeks. He was 29 years old and son of L. A. Nickell Sr., president of the companies.

Mr. Nickell was one of the prominent young business men of Columbia, president of the Junior Chamber of Commerce, treasurer of Alpha Tau Omega, and a director of the Rotary Club. He was a veteran of World War II serving from 1942 to 1945, becoming a Second Lieutenant in the Quartermaster Corps. He was graduated from Missouri State University in 1942 and attended Stanford graduate school at Berkeley, Calif. The Junior Chamber of Commerce has created a memorial fund to be used for establishing a recreational park for children.

He is survived by his parents, his widow, Mrs. Nedra Mae Nickell and a daughter, Marcia Lindra.

Henry H. Wade

THE death of Henry Hamilton Wade, formerly secretary-treasurer of the Northwest Ice & Storage Company, occurred July 18 following an extended illness. Mr. Wade was 71 years old and had retired.

Before his connection with the Northwest Ice & Storage Company, he was part owner of the Candy Products Company and had been auditor for the Northwest Bridge and Iron Corp. and the Columbia River Shipbuilding Company. He was born in Massachusetts and came to Portland in 1904.

He is survived by his widow, Mrs. Grace Wade; a son, John C., Billings, Mont.; and a daughter, Mrs. Thomas B. McKinstry, Oakland, Calif.

OSCAR E. JOHNSON, retired refrigeration engineer, Memphis, Tenn., died July 22. He was 69 years old. Mr. Johnson formerly owned ice plants and cotton gins in various sections of the Midsouth. He was born in Indiana and moved to Memphis about 40 years ago. He is survived by his widow, Mrs. Louise Falk Johnson.

ALEXANDER Z. MARION, retired operator of the Marion Ice & Oil Co., Holyoke, Mass., died June 26. Mr. Marion had operated the local ice and oil plant for 40 years until his retirement two years ago.

ROBERT L. DIAL, associated with the Atlantic Ice & Coal Company, Atlanta, Ga., before his retirement died August 1 at his home in Union City. Mr. Dial was an inspector for the Atlantic Company for more than 15 years. He was 73 years old. Surviving are three daughters and two sons, all living in Atlanta.

Lou W. Collins

THE death of Lou W. Collins, well known ice man and civic and fraternal leader of Kalamazoo, Mich., occurred suddenly in the yard of his home Sunday afternoon, August 5. Death was attributed to a heart ailment. He was 60 years old.

Vice-president and sales manager of the Kalamazoo Ice & Fuel Company, Mr. Collins was looking forward to next December when he planned to retire from active business. He had been with the Kalamazoo Ice & Fuel Company for 30 years, since 1922, when he had joined the company as a salesman and was elected to the board of directors in 1925 and vice-president in 1936.

He served as mayor of Kalamazoo from 1941 to 1943, on the city commission in 1937, a member of the county board of supervisors, vice-mayor in 1939 and again in 1943, Republican county chairman and chairman of the Kalamazoo County department of social welfare.

He was a director of the Kalamazoo chamber of commerce, co-ordinator of civilian defense, chairman of the USO and a marine recruiting officer during World War II. He was past worshipful master of Kalamazoo Masonic lodge and past eminent commander of Knights Templar. He also belonged to the Elks lodge and the Fraternal Order of Eagles. He was an overseas veteran of World War I, and a member of the American Legion and Veterans of Foreign Wars.

He is survived by his widow, Mrs. Gertrude Collins, a son Louis George Collins of Milwaukee and a daughter, Mrs. Dorothy Shannon, Climax, Mich.

Edgar D. Eward

THE death of Edgar D. Eward, treasurer and manager of the Consumers Ice Co., Ft. Wayne, Ind., from 1913 until he retired in 1934 occurred at the Lutheran Hospital, Ft. Wayne, where he had been a patient four days. He was 81 years old.

Mr. Eward was well known among members of the ice industry, having been an active member of both the National and the Indiana Associations of Ice Industries. He was also a member of Kiwanis. He is survived by his widow, Mrs. Tressie Eward; a son, Harold D., and a daughter, Mrs. Frank Whitler.

CHARLES H. SCHICHT, Highland Park, Ill. who had been vice-president of Westerlin & Campbell, refrigeration equipment dealers until retiring six months ago, died in Phoenix, Ariz. July 14. He was 66 years old. He had been with Westerlin & Campbell 35 years.

SAMUEL B. RAVEGUM, retail ice dealer, Lancaster, Pa., was stricken fatally while delivering ice July 6. He was 70 years old. Mr. Ravegum had lived in Lancaster for fifty years and had been an ice deliveryman for forty-nine years.

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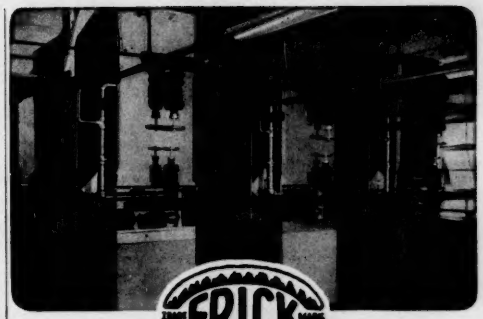

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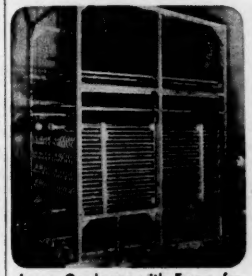

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Herbert G. Terry

THE death of Herbert G. Terry, manager of the American Service Company, Southwest Division, San Antonio, Texas occurred August 5 at Nix Hospital, San Antonio. He was 56 years old.

Herbert G. Terry

Mr. Terry was born at Mineola, Tex., and had lived in San Antonio 27 years. He was an active member of the Southwestern Ice Manufacturers Association and of the National Association of Ice Industries. A veteran of World War I, he was a member of the American Legion, Alamo Masonic Lodge, San Antonio Consistory and Alzafar Shrine.

He is survived by his widow, Mrs. Martha Duncan Terry and three sons, Thomas and Jerome of San Antonio and Bertrand of Washington, D. C.

C. F. Anderson

HEAD of one of the state's largest ice plant chains, C. F. Anderson, died at his home in Oklahoma City July 22 at the age of 76 years. He was president of the Anderson Arctic Ice Company which he had founded in 1917. The company operates ice plants in Oklahoma City, Kingfisher, Hennessey, Elk City, Caldwell, Kans., Shamrock and Wheeling, Texas.

Mr. Anderson was born in Bedford, Iowa and moved with his parents to Winfield, Kans., in 1876. In 1906 he became associated with the Capitol Ice Co. in Wichita Kans., and came to Oklahoma City in 1917 to build his own plant. He is survived by his widow, Mrs. Clara Anderson and one daughter, Mrs. Robert C. McFarlene, Oklahoma City.

EDGAR EARL DAUGHTY, Dallas, Tex., retired ice dealer, died July 22. He was 74 years old. He had been a resident of Dallas for 42 years.

S. WILLIS LONG, manager of the New Ice Company, Greenville, Tex. died Sunday, August 5, at the age of 69 years. He had been in ill health for several months. Mr. Long had been a resident of Greenville since a boy.

ANTHONY J. MATTER, retired coal and ice dealer, Buffalo, N. Y., died August 13 of a heart attack. Until he retired seven years ago, he had been in partnership with his brother, Clemens B. Matter. The business is now operated by his brother and a nephew. He was 73 years old. He served in the U. S. Navy for six years and saw service during the Spanish American War.

GUST EDWARD JOHNSON, operator of an independent ice route, Minneapolis, Minn., until he retired a few years ago, died August 13. He was 71 years old. Mr. Johnson had been a resident of Minneapolis 49 years. He is survived by a daughter and two sons.

GROVER HOEFLING, engaged in the ice, coal and oil business in Jersey City, N. J., for several years, died August 16 at the age of 59 years. He was a lifelong resident of Jersey City. He is survived by his widow, Mrs. Emma Hoefling and a son.

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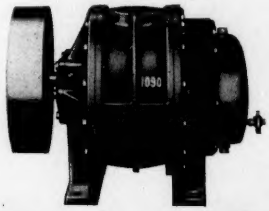

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★ Saves Weight
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View of Mezzanine Lard Storage Room
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8 Page Topical Index

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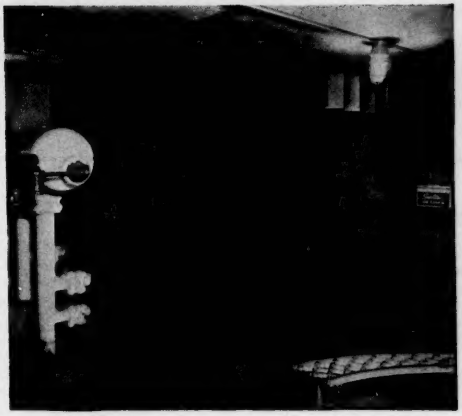

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See how this means money savings. You run with higher suction pressures and lower head pressures, saving power. Your wear and tear and maintenance is lower; you save the loss of production and the labor used in defrosting periods. You save the power that is wasted when refrigeration is supplied through coils that are frost-coated.

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INDUSTRIAL COOLING • HEATING • DRYING
NIAGARA
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

What's New

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APPLIANCES • PROCESSES

York Introduces Low Temperature Unit Cooler

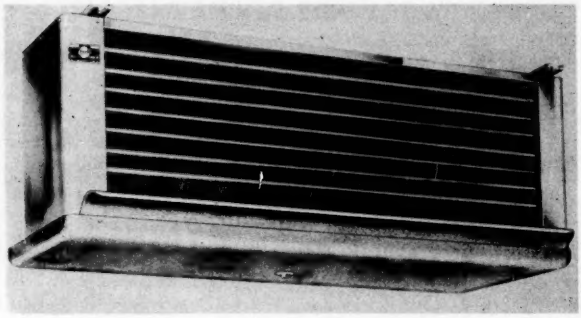
SEVEN models of low temperature unit coolers using ammonia refrigerant and seven similar models using Freon have been placed into production by York Corporation, according to John R. Hertzler, vice-president and general sales manager.

These new units are for applications requiring below freezing temperatures such as, frozen food storages, fur storages, meat packing plants, ice-cream plants, etc.

Hertzler pointed out that these units are compact and provide rapid defrosting by water spray. Unit coolers may be used in multiple where greater capacity is required.

New Concentrator Eliminates Frost

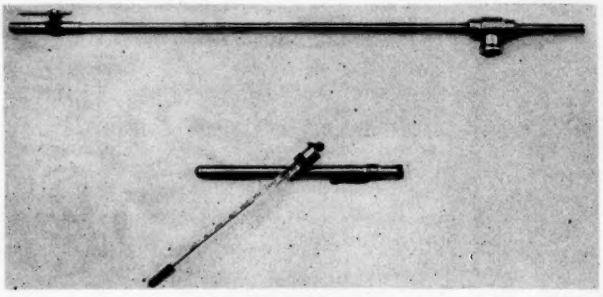
A NEW concentrator designed to eliminate frost has been developed by the Niagara Blower Co. According to sales literature issued by the company, the device provides lower concentrating temperature, with easier and cleaner method, automatic operation and low operating cost. It is available in four models, with capacity range from ½ to 6 gallons per hour and requiring 2½ to 4½ sq ft of floor space. Bulletins 118 to 119 are available, giving construction information and other details.



York Corp. Low Temperature Unit Cooler

Spot Cooling Device Described in New Bulletin

THREE models of Belmont Hilsch Vortex Tubes are catalogued in a new leaflet, Form V-2-551. Text describes the use, in these devices, of an internal vortex to separate a flow of compressed air (or other gas) into hot and cold fractions which can be used in a wide variety of ways for calibrating instruments, cycle-testing equipment, cooling thermocouples, etc. Operating - characteristic curves are provided to show temperature drop below that of inlet air over a range of 15 to 82 degrees and rate of flow for various input pressures. Specifications and prices are listed.



Belmont Hilsch Vortex Tube

Freeze-Drying Package Unit

A COMPACT, factory - assembled freeze-drying unit has been announced by the F. J. Stokes Machine Co., Philadelphia 20. It employs Freon refrigeration for drying guinea pig complement, cultures, serums, vitamins, and other biologicals.

New Stokes Freeze-Drying Unit

Drying and freezing are accomplished in a tank beside the condensing chamber, on an electrically heated and thermostatically controlled drying shelf. Sight glass in lid permits inspection during freezing. With batch capacity of 3500 milliliters, this unit offers large volumetric capacity at low operating cost.

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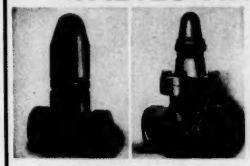
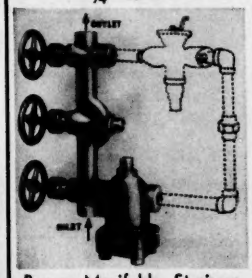


Seal-Cap Valves in Sizes ¾" to 8"



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Frick Valves on a Typical Job

Have a century of engineering experience built into them. Valves have high-angle seats which give a tight wedging closure: back seat makes repacking easy: good for Freon, ammonia, and other high-pressure work. Write for Catalog which gives sizes, dimensions, weights and prices. Frick float and electric control valves are widely used, have many superior features. Get facts and figures now on the equipment you need: write

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Also Builders of Power Farming and Sawmill Machinery

MANUFACTURERS' NEWS

York Sales and Earnings Increase

SALES and earnings of the York Corp. for the nine months ended June 30, 1951 were reported to stockholders. Completed sales amounted to $45,730,837 compared with $37,368,606 for the similar period a year earlier, an increase of 22 percent. New business booked for the same period was $50,123,411, up 44 percent. Earnings after taxes amounted to $2,259,115, an increase of 21 percent. Income taxes amounting to $2,661,180 were in excess of earnings after taxes and were 100 percent greater than in the similar period a year ago.

Hartman Heads Armstrong Industrial Insulation Dept.

WARDEN N. Hartman has been appointed manager of the industrial insulation department of the Armstrong Cork Company, it was announced by H. R. Peck, Vice-President and General Manager of the Company's Building Materials Division. Mr. Hartman became associated with Armstrong as a sales trainee in 1939. Since 1948 he had been manager of the contract operations department. Mr. Peck also announced that Sloane C. Martin will continue as manager of the company's low-temperature insulation products while James W. Liddell has been named manager of high-temperature insulation products, succeeding F. W. Muller who has resigned.

Trusty Dealership

TO serve the four state area of Illinois, Wisconsin, Minnesota and Iowa, Skinner & Skelton, Chicago, have been appointed by Trusty Manufacturing Inc., La Porte, Ind. As part of their sales plans a complete display room for the Trusty line has been set up at 100 North La Salle St.

Easier and Cheaper with

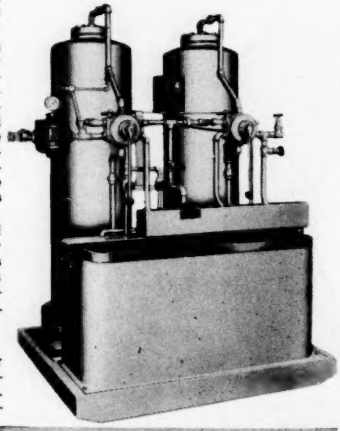
INDUSTRIAL Water Demineralizer

It's worth looking into . . .

The demineralization of water is not something new. It is used in the food industry, in the chemical and other industrial processing where chemically pure water is used in quantity. The very low cost warrants your looking into it.

Here are some of the advantages you get with an INDUSTRIAL demineralizer in ice making. Since the dissolved mineral salts in ordinary water are removed in passing through the ion-exchange resins, core-water removal and replacement is unnecessary. Losses due to cracking are greatly reduced. Freezing at the lower brine temperature increases daily yield. And the bulk of the cake of ice is clearer—your customers will notice that.

If you will send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour) we will send you information on INDUSTRIAL demineralizers, estimate of costs, performance data, etc. Better do it now.



A typical two-bed INDUSTRIAL Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

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RUBBER DIVISION Vulcanized Linings • Molded Products · WATER DEMINERALIZERS

CATALOGS and BULLETINS

Booklet on Piping and Process Insulation

A NEW booklet on Foamglas insulation for piping and process equipment has been issued by the Pittsburgh Corning Corp. In 24 pages it discusses the advantages of Foamglas, listing its properties, typical data for cold, intermediate, and hot applications, details for insulating tanks, ducts, removable covers, and tank heads, accessory materials, and prominent users, and distributors. As an industrial insulant this material has many advantages including flexibility in on-the-job fabricating, durability, incombustibility, resistance to acids, ability to retain its original insulating value, resistance to moisture and vapor, light weight, and rigidity. Tables in the booklet show sizes and shapes of Foamglas available in pipe insulation, standard blocks, beveled lags, and standard curved segments.

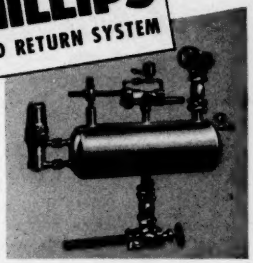
Specification Booklet For Cold Storage Doors

A NEW 12-page data and specification booklet has been prepared by Jamison Cold Storage Door Co., to guide architects, contractors, and builders in their selection of the proper type of cold storage door for various temperature conditions.

The booklet illustrates basic types of doors for various temperature ranges—reach-in, walk-in, track, and vestibule—and gives suggested specifications and outline dimensions. Information will be useful to institutions, markets, cold storage warehouses, locker plants and food processing plants.

An additional feature of the booklet is a check list of items to remember when selecting and specifying a cold storage door.

for Complete
COMPRESSOR PROTECTION
install a **PHILLIPS LIQUID RETURN SYSTEM**



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PHILLIPS FLOAT CONTROLS
For "Freon"—1 to 1000 Ton Cap
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Several types of systems are available: for Gravity, Injection Lift and Pressure Lift operation, in sizes up to 1000 tons. A Phillips Engineer will gladly help to select the right one to assure complete protection for you. Write today for full information in Bulletin LRS-50.

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A Layne built well water supply will produce great quantities of water at a remarkably low cost. Furthermore, with a Layne system of your own, you need no longer depend on a source of supply that is too costly, inadequate or unsatisfactory. These systems are famous for their high efficiency and extra long life. Thousands have been installed for all types of industry, municipalities and farms using irrigation. Layne does the job complete; drills the wells, furnishes and sets casing, sand screen and pumps. Why not consider a system of your own? For further information, catalogs etc., address

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is the Refrigeration BRINE MEDIUM

that...

- Provides a "long-life" brine . . . lowest cost in long run
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- Assures maximum life of equipment
- Flows easier . . . requires less pumping
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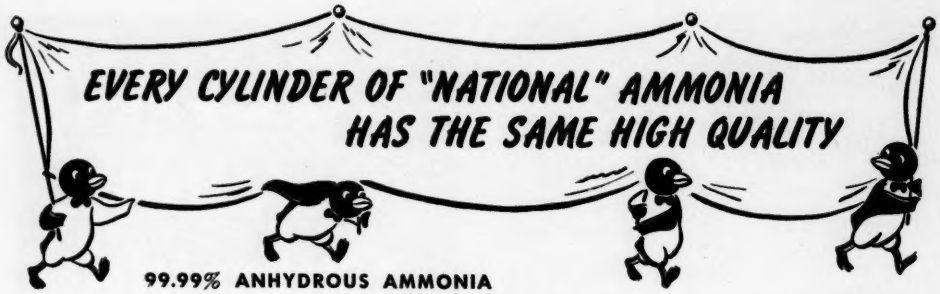

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THE BUYERS DIRECTORY

INDEX TO ADVERTISEMENTS OF THESE FIRMS—PAGE 80

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Vogt Machine Co., Henry, Louisville, Ky.

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Ice Plant Equipment Co., Inc. Philadelphia, Pa.

AIR COMPRESSORS
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.

AMMONIA COMPRESSORS
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
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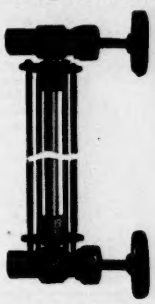
Provide maximum service under toughest operating conditions.



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For Ammonia and Freon. One piece body design—rustproof finish. Internal construction — stainless steel — will not corrode. Positive relief action. Pressures from 75 to 400 lbs.

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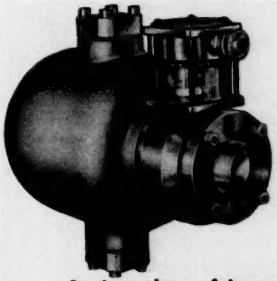

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Seeing the refrigerant level in evaporators or accumulators is a big help in diagnosing operating problems.

- Mojonnier MS Float Switches have sight glasses that show clearly the refrigerant at its operating level. You can check accurately the liquid level on any evaporator or accumulator in your plant.
- This new-principle magnetic switch is enclosed in waterproof, transparent housing for easy observation.
- Used on ammonia, F12 and F22—on hundreds of applications throughout the country.
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MS FLOAT SWITCH

New **"BIG CHIEF"**

FAST, ECONOMICAL CRUSHER
Saves Time and Labor Costs!

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Price: $335 less motor, F.O.B. Mineral Wells, Tex. 2 hp, 1 phase, mtr. 170.80
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(See Ice Making and Refrigerating Machinery)

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Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.

COOLING TOWERS
Frick Co., Waynesboro, Pa.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa.

CORROSION CONTROL
Wright Chemical Control Corp., Chicago, Ill.

COUPON BOOKS
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

COVERINGS (PIPE AND BOILERS)
Armstrong Cork Co., Lancaster, Pa.

CYLINDERS (GAS & LIQUID)
Byers Co., A. M., Pittsburgh, Pa.

DEIONIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DEMINERALIZING EQUIPMENT
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

DIP TANKS AND CAN BASKETS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

DRIVES, TRANSMISSIONS
Frick Company, Waynesboro, Pa.

ELEVATING & CONVEYING MACHINERY
Capital Elevator & Mfg. Co., Columbus, Ohio
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.

ENGINEERS AND ARCHITECTS
(See Architects and Engineers)

EVAPORATIVE CONDENSERS
Niagara Blower Co., New York, N.Y.

EVAPORATORS
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FEED-WATER HEATERS
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

FIBERGLAS
Armstrong Cork Co., Lancaster, Pa.

FIELD ICE SAWS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

FILTERS, CLARIFYING
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

FILTERS, WATER
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

FILTRATION EQUIPMENT
Industrial Filter & Pump Mfg. Co., Inc., Chicago, Ill.

FIN COILS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.

FIRST AID SUPPLIES
Acme Protection Equipment Co., Chicago, Ill.

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Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FLOAT VALVES
Mojonnier Bros. Co., Chicago, Ill.

FOOD FREEZING EQUIPMENT
Howe Ice Machine Co., Chicago, Ill.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Capital Elevator & Mfg. Co., Columbus, Ohio
Conveyor Co., The, Los Angeles, Calif.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.

HUMIDITY AIR CONDITIONERS
Niagara Blower Co., New York, N.Y.

ICE BAGS
International Paper Co., New York, N. Y.
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.

ICE CANS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

ICE CHIPPERS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

ICE CHUTES
Conveyor Co., The, Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.

ICE CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.
Refrigeration Engineering Co., Montgomery, Minn.
United Ice & Oil Supply Co., Boston, Mass.

ICE CREAM PLANTS
Frick Co., Waynesboro, Pa.

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
United Ice & Oil Supply Co., Boston, Mass.

ICE CUBE CONTAINERS
Index Coupon & Supply Co., La Porte, Ind.
International Paper Co., New York, N. Y.
Union Bag & Paper Co., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

ICE CUBING MACHINES
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
United Ice & Oil Supply Co., Boston, Mass.

ICE DELIVERY BAGS
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
International Paper Co., New York, N. Y.
Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

ICE MAKING AND REFRIGERATING MACHINERY
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

ICE PICKS AND PLANERS
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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

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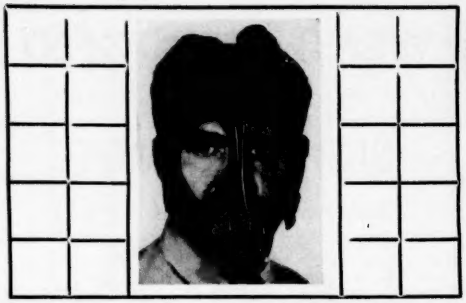

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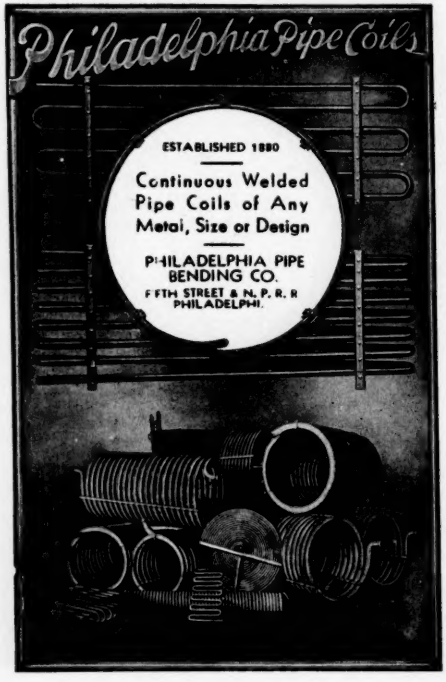
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THE BUYERS

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Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

ICE PICK VENDING MACHINES
United Ice & Oil Supply Co., Boston, Mass.

ICE PLANTS
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

ICE SCALES
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

ICE SHAVERS
Conveyor Co., The, Los Angeles, Calif.

ICE TOOLS
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

INDUSTRIAL INDICATING INSTRUMENTS
Taylor Instrument Companies, Rochester, New York

ICE VENDORS
Frick Company, Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Montgomery, Minn.
S & S Vending Machine Co., San Jose, Calif.
United Ice & Oil Supply Co., Boston, Mass.

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
Armstrong Cork Co., Lancaster, Pa.

INSULATION ADHESIVES
American Bitumuls Co., San Francisco, Calif.

LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

MAGNETIC FLOAT SWITCHES
Mojonnier Bros. Co., Chicago, Ill.

MASKS, AMMONIA
Acme Protection Equipment Co., Chicago, Ill.

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Ohio Galvanizing & Mfg. Co., Niles, Ohio

OIL AND LUBRICANTS
Texas Co., The, New York, N. Y.

OILS, CUTTING
Texas Co., The, New York, N. Y.

OILS, FUEL
Texas Co., The, New York, N. Y.

PACKINGS
Frick Company, Waynesboro, Pa.

PIPE COILS AND BENDS
Acme Industries, Inc., Jackson, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PIPE WELDING
Acme Industries, Inc., Jackson, Mich.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

PIPING
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Frick Company, Waynesboro, Pa.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PRESSURE BLOWERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PROPELLERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

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Aurora Pump Co., Aurora, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Layne & Bowler, Inc., Memphis, Tenn.
Roots-Connersville Blower Corp., Connersville, Ind.

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Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS, AMMONIA AND BRINE
Frick Company, Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.

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Aurora Pump Co., Aurora, Ill.
Layne & Bowler, Inc., Memphis, Tenn.

PUMPS, ROTARY
Aurora Pump Company, Aurora, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
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Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

REBOILERS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

RECORDING THERMOMETERS
Taylor Instrument Companies, Rochester, New York

REFRIGERATED ICE STATIONS
Refrigeration Engineering Co., Montgomery, Minn.
S & S Vending Machine Co., San Jose, Calif.

REFRIGERATING AND ICE MAKING MACHINERY
(See Ice Making and Refrigerating Machinery)

RESPIRATORS
Acme Protection Equipment Co., Chicago, Ill.

SCORING MACHINES
Frick Company, Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

SECOND HAND MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
United Ice & Oil Supply Co., Boston, Mass.

SEPARATORS OIL, STEAM AND AMMONIA
Acme Industries, Inc., Jackson, Mich.
Frick Company, Waynesboro, Pa.
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

SIZED ICE EQUIPMENT
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

SPRAY NOZZLES
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

STORAGE HEATERS
National Pipe Bending Co., New Haven, Conn.

STRAINERS
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

TANKS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

TARPAULINS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.

THERMOMETERS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Taylor Instrument Companies, Rochester, New York

THERMOMETERS, RECORDING
Taylor Instrument Companies, Rochester, New York

TIERING MACHINES
Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

TRAPS, OIL & STEAM
Armstrong Machine Works, Three Rivers, Mich.

UNIT COOLERS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.
Rempe Company, Chicago, Ill.

USED MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.

VALVES AND FITTINGS
Alco Valve Co., St. Louis, Mo.
Frick Company, Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Phillips & Co., H. A., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

WATER COOLERS
Acme Industries, Inc., Jackson, Mich.
Niagara Blower Co., New York, N.Y.
Vogt Machine Co., Henry, Louisville, Ky.

WATER TREATMENT MATERIALS
Chemical Solvent Co., Birmingham, Ala.
Industrial Filter & Pump Mfg. Co. Inc., Chicago, Ill.

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Frick Company, Waynesboro, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
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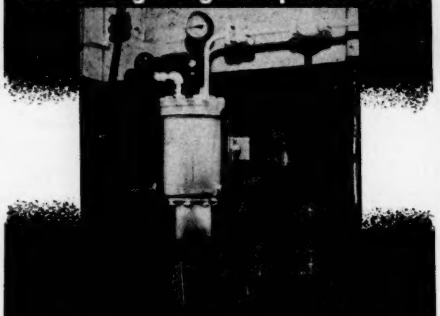

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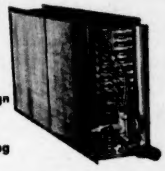

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1—4x4 York, 300 RPM	16
6—6x6 York's, 200 RPM	20
1—6x6 Frick, 257 RPM	21
2—6x6 York's, 400 RPM, forced-feed lubrication	25
2—6½x5½ Arctics, 350 RPM, forced feed lub.	30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication	35
1—7x7 Frick, 200 RPM	40
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Steam Driven

1—8x8 Vertical York, 300 RPM direct connected	327

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1—15-ton electric driven plant	630
6—50-Ton Ice Plants, 10 can pull complete	631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull	632
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1—35-38 ton New Clear Ice Making Plants	635
1—150 Ton Multi lift—1622 Can Plant	636
1—702 Can Plant—9 Can Pull	637
1—920 Can Plant—12 Can Pull	638
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1—3x3 Worthington	748
1—5x5 Frick—Forced Feed—400 RPM Latest Type	758

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1—300 lb. ULINE, fully automatic cuber	501
1—50 lb. F & E Safety Cuber	502

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3—100 ton shell and tube condensers retubed	919
1—125-ton, Vertical Shell & Tube, 196 2" tubes	921
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2—20 ton Horizontal—retubed	924

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1635 Westminster Ave. Detroit 11, Mich.

USED EQUIPMENT-wanted & for sale

FOR SALE—7x7 high speed late model ammonia compressor—like new—immediate delivery. Bicknell Ice & Coal Co., 8th & Cleveland Sts., Bicknell, Indiana.

FOR SALE—500 ice cans 11x22x47-48—good condition, $2.25 each F.O.B. Baltimore. 1000 brass drop tubes 50c each. C. Hoffberger Company, 1517 N. Gay St., Baltimore 13, Maryland.

USED EQUIPMENT-Continued

FOR SALE—Bush ammonia blower unit coolers—U.C.S. No. 105. Practically new; in fact, they are equal to new. Will sell at a bargain. National Ice & Products Co., 322 East 15th St., New Albany, Ind.

FOR SALE—One Link-Belt ice crusher slinger, Model 440, capacity 50 to 60 tons per hour. Never used. American Refrigerator Transit Co., 1218 Olive St., St. Louis 3, Mo.

FOR SALE—Several sizes of ammonia and Freon compressors, ice plants, coils, brine coolers, condensers, receivers, oil traps, agitators, Diesel engines. Write us your requirements. Parke Pettegrew & Son Company, 370 West Broad St., Columbus 8, Ohio.

FOR SALE—Ice vendor, 3 deck positive 16" belt driven, approximately 35' long, with three box St. Louis coin rejector controls. New. Bargain. Dixie Engineering & Supply Company, 305 Washington Ave., Memphis 3, Tenn.

FOR SALE—Evaporator coil—50 ton new, built by Crane Co. Flooded type; immediate delivery. Write for description or photo and measurements; also compressors 2x2 to 8x8; valves, all types, cork insulation, board and granulated. Electrical Repair Co., 210 Prescott St., St. Paul 7, Minn.

FOR SALE—One 4x4 York ammonia compressor, 5 h.p. motor; one 3x3 York ammonia compressor, 5 h.p. motor; one York ammonia compressor 1 h.p. motor; 2 condensers, 3 receivers and fittings; about 2500 feet of gal. coil in 12 ft., 14 ft. and 18 ft. banks, excellent condition. About 1500 ft. of black pipe coil, condition fair. This may be inspected at Schmidt's Market, Portage, Wisc.

FOR SALE—ICE PLANTS & EQUIPMENT

30-50-60 Ton Ice Plants—Immediate Sale
Ice Cans—11 x 22 x 47"—Good Condition
Ice Cans—11 x 22 x 51"—Excellent Condition
1—Frick 12 x 12" Ammonia Compressor direct connected to Diesel Engine—can be purchased without Diesel.
1—York 10 x 10" Ammonia Compressor direct connected to synchronous motor 3/60/440 Speed 300
1—York 10 x 10" Ammonia Compressor direct connected to 60 H.P. synchronous motor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor direct connected to 100 H.P. synchronous motor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor 200 R.P.M.
1—York 10 x 10" Ammonia Compressor High Speed
2—York 10 x 10" Cylinder heads, pistons and connecting rods for High Speed Ammonia Compressors
1—York 8 x 8" Ammonia Compressor direct connected to 60 H.P. synchronous motor 160 R.P.M.
1—York 8 x 8" Ammonia Compressor High Speed
1—York 6 x 6" Ammonia Compressor High Speed
1—Voss 6 x 6" Ammonia Compressor High Speed
1—York 5 x 5" Ammonia Compressor High Speed
1—Frick 4 x 4" Ammonia Compressor (New)
2—Frick 3 x 3" H. S. Self Contained Units Can supply motors for all compressors. Low Pressure blowers—all sizes.
Assorted sizes electric hoists and cranes ranging from 2 to 6 ton capacity.
2—Gifford-Wood Tiering Machines, 1-three and 1-four tier.
3—Scoring Machines Perfection.
2—Sheppard Cranes 4 and 5 ton capacities—3 motor jobs.
Brine Coolers, submerged shell and tube type. 1¼" and 2" ammonia coils, approximately 10,000 feet.

Send Us Your Requirements on Any Equipment You May Need.

ENTERPRISE EQUIPMENT CORPORATION
77-79 Alexander Street, Yonkers, N. Y.
Phone: Yonkers 8-8118-9
Cable Address: ENEQCO

USED EQUIPMENT—continued

FREON COMPRESSORS

1—York D-6, 12½x9, direct connected to synchronous motor 125 h.p. 2 ph., 60 cy. 220 V. 360 r.p.m. Exciter & starting equip.
1—York D-4, 11x9 & D-6, 12½x9, with 225 h.p. synchronous motor in center, 327 r.p.m. 2 ph. 60 cy. 220 V. Exciter & starting equip. Like new—Bargain for quick sale.

H. LOEB & SON
4643 Lancaster Ave. Philadelphia 31, Pa.

FOR SALE—One 6x6 Frick fully automatic start and stop compressor, also condenser and water cooler. Three 9x9 Frick ammonia compressors. Three shell & tube condensers, also water pumps, agitators, blowers and cranes. Three shell & tube brine coolers; storage room coils. Three ice freezing tanks, spray pond, pipe and nozzles; electrical switches. Pailet Industries Inc., 716-724 Frisco Ave., New Orleans 20, La.

FOR SALE—One 7½x7½ high speed York. One 3x3 and 4x4 self-contained Yorks. 3x3, 4x4, 5x5, 6x6, 8x8 and 9x9 medium speed Yorks. Two 5x5 Fricks. Two 25 ton shell and tube condensers. One 10 ton enclosed brine cooler. York 10 ton blower unit float control. 16" x 12' and 20" x 8' receivers. Four Freon Acme suspended type blower units. 2-ton Niagara ammonia blower unit. Write E. Niebling, 1546 St. Clair Ave., Mount Healthy, Cincinnati 31, Ohio.

FOR SALE—ICE PLANTS & EQUIPMENT

10, 15, 20, 30, 50 ton ice plants.
2—10x10 York ammonia compressors.
1—9x9 York ammonia compressor direct connected to a 75 h.p. synchronous motor.
1—9x9 York ammonia compressor 200 r.p.m.
1—8x8 York ammonia compressor 360 r.p.m.
1—7½x7½ York ammonia compressor with 40 h.p. 3/60/220 motor.
1—6½x6½ York ammonia compressor with capacity control valves.
1—6½x6½ York ammonia compressor 200 r.p.m.
1—5x5 Frick ammonia compressor 277 r.p.m.
1—4x4 York ammonia compressor 400 r.p.m.
1—4x4 York self-contained unit.
2—3x3 York self-contained units.
1000 ice cans, various sizes.
Motors and starters for all compressors.
Condensers, brine coolers, cranes, can dumps, can fillers, valves and fittings. Send us your requirements on any equipment that you may need.

B & E REFRIGERATING CO.
2 Orange St., Newark 2, N. J.
Phone MItchell 3-7790 Cable Address "BERECO"

FOR SALE—USED EQUIPMENT

1—35 ton York low pressure, electric drive, synchronous motor driven, 4 can lift, well pumps vertical shell & tube condenser, piping, panels complete.
1—100 ton York and Frick ice plants.
1—50 ton York ice plant.
1—70 ton Vilter ice plant.
1—200 ton York ice plant.
1—120 ton York ice plant.
1—400 ton York ice plant.
2—300# Champion ice crushers with 7½ h.p. motors, with hoppers and chutes.
1—Model F Gifford-Wood 2 way scoring machine.
1—Perfection 2 way scoring machine.
3—Tiering machines, 4-6-8 Tiers.
1—Gifford-Wood Model #560 Ice Crusher, in original crate.
1—90 ton horizontal shell and tube condenser.
500—11"x22"x47" ice cans, good condition.
500—11"x22"x50" ice cans, good condition, LIKE NEW.
1—4x4 York self-contained unit, 5 h.p.
102—Door type Master lockers, 15"x24"x30".
102—Drawer type Master lockers, 16"x24"x30".
1—Model 54-Y Creasey ice crusher, belt drive.
Conveyor chain—6" pitch.
Send us your requirements on equipment you need.

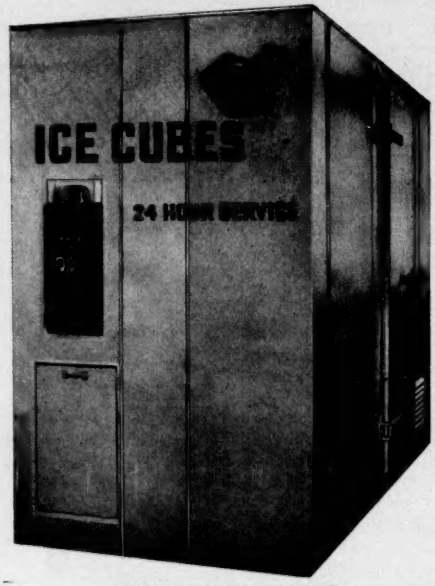
UNITED SUPPLY & EQUIPMENT CO., INC.
55 Beverly Street Boston 14, Mass.

COLD STORAGE EQUIPMENT

Frick 30"x16'-0", 100-ton, 80 tube vertical single pass condenser. Excellent condition, $450.00. Frick 9x9 compressor, forced feed, 190 r.p.m., good condition. Good ammonia valves, both screw and flange types, ½" to 6", at bargains. Lots of other good equipment. Tell us what you need.

AAA STEEL & SUPPLY CO.
Canton & Hawkins Sts. Dallas 1, Texas

The NEW POLAR CUBED and CRUSHED ICE VENDING STATION



Patented—Design Patent Applied For

Belt Capacity— 50 ten-pound bags
Storage for 200 ten-pound bags
PRICE: LESS THAN $1500.00

POLAR PRODUCTS ARE BUILT OF THE FINEST MATERIALS BOTH *EXTERNALLY* AND *INTERNALLY*.

Check these POLAR features:

1. Completely covered with embossed aluminum.
2. Armstrong fibreglas insulation.
3. Aluminum foil vapor seal paper.
4. Automatic electric defrost.

ALL of these special POLAR features are included in the new Premium ice vending units.

1. Gives maximum utilization of refrigerated space. Ice can be bagged in station.
2. Fits in a small space, easily placed. Cabinet is 8'-10" long, 6'-6" high, 46" wide. Specially suited for heavily populated downtown locations.
3. Shipped ready to operate—just plug in. Equipped with front light and time clock.
4. Beautiful in appearance. Identical material as used in regular POLAR line.
5. One piece aluminum weatherproof roof.

For further information and descriptive literature-- write

REFRIGERATION ENGINEERING COMPANY
Montgomery, Minnesota

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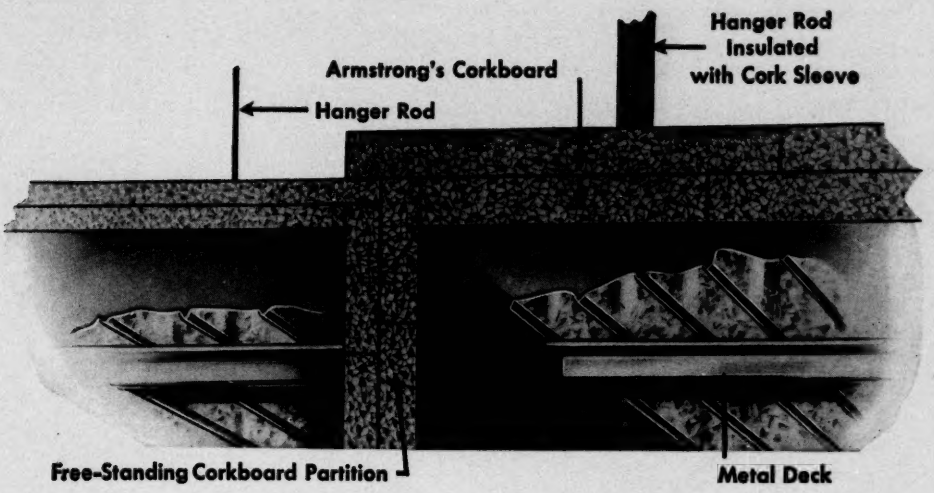


WE HAVE BEEN ASKED:

"What is the best way to join a free-standing cork partition and a metal deck?"

"We are specifying a metal deck ceiling in a 20° below zero freezer and an adjoining 35° anteroom," writes an architect. "The design calls for a free-standing cork partition between these two rooms. Just how should I join the partition and the metal deck?"

The illustration above shows the method Armstrong advised. As you can see, the metal deck is broken so that the cork partition can pass through and tie right into the cork ceiling insulation.

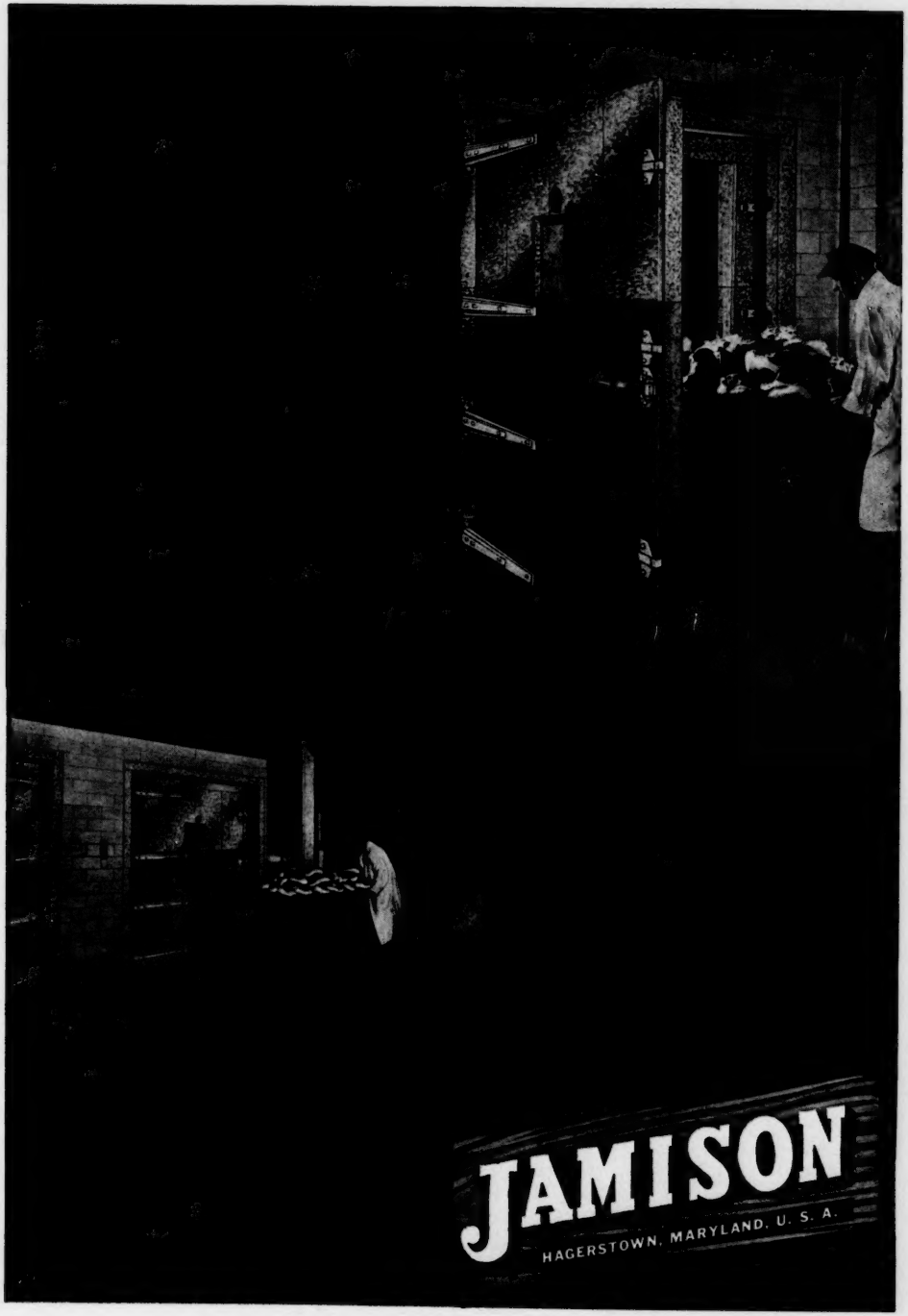
If you were to run the deck through both rooms and just butt the partition against it, the metal would get so cold in the 35° anteroom that condensation and frost would form on the deck adjacent to the partition. This condition will result in considerable loss of insulating efficiency at this point and in accumulation of moisture and unpleasant conditions in the anteroom as well.

When you're hanging the deck, leave a gap in it so that the free-standing wall will join the corkboard ceiling. The gap should be approximately 1" wider than the thickness of the insulation specified to allow ample clearance for putting up and finishing the partition.

Furnishing the right answers to questions on low-temperature insulation problems is just one of the services offered by Armstrong engineers. The complete contracting organization they represent also supplies top-quality insulation materials and skilled workmen to apply them. When you need advice on low-temperature insulation, call Armstrong.

SEND US YOUR QUESTIONS: If you have any questions on the use of insulating materials or the construction of low-temperature facilities, please do not hesitate to write to us. We'll see that you get a practical answer. Just address a letter or post card to Armstrong Cork Company, 4509 Concord Street, Lancaster, Pa.

ARMSTRONG'S INDUSTRIAL INSULATIONS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